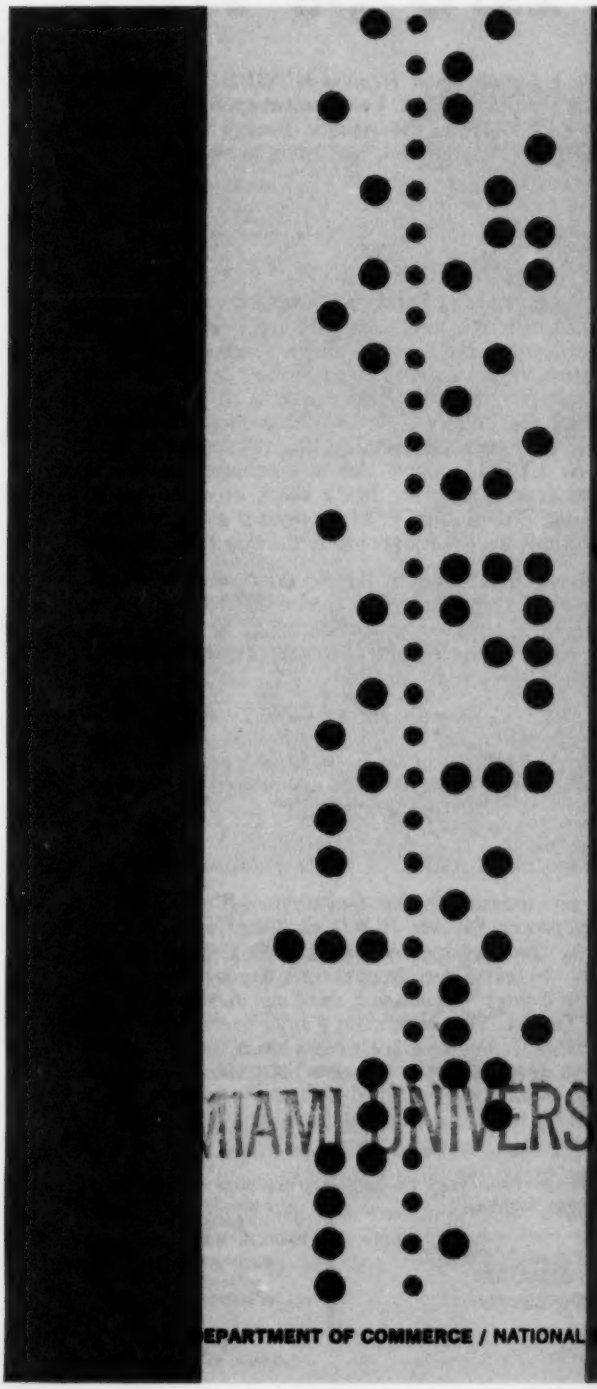
C 41.21: 67/16

August 25, 1967

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS



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INDEX

All entries in USGRDR are indexed in the *Government-Wide Index to Federal Research & Development Reports (GWI)* published semi-monthly and sold on subscription by the Clearinghouse at $22.00 a year ($27.50 foreign). Single copy $3.00. Indexing data from current issues of announcement journals of the Atomic Energy Commission, National Aeronautics and Space Administration, and Defense Documentation Center are also included in this index to provide a single reference guide to new unclassified Government-sponsored research and development in the physical sciences, engineering, and related technology.

U.S. DEPARTMENT OF COMMERCE
Alexander B. Trowbridge, Secretary

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FOREWORD

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS is produced by computer from machineable records generated by four Federal agencies which announce R&D reports. Machineable records from the Atomic Energy Commission, the National Aeronautics and Space Administration, the Defense Documentation Center and the Clearinghouse for Federal Scientific and Technical Information are merged to produce USGRDR. All of the reports announced in USGRDR are indexed in the companion index, GOVERNMENT-WIDE INDEX TO FEDERAL RESEARCH & DEVELOPMENT REPORTS.

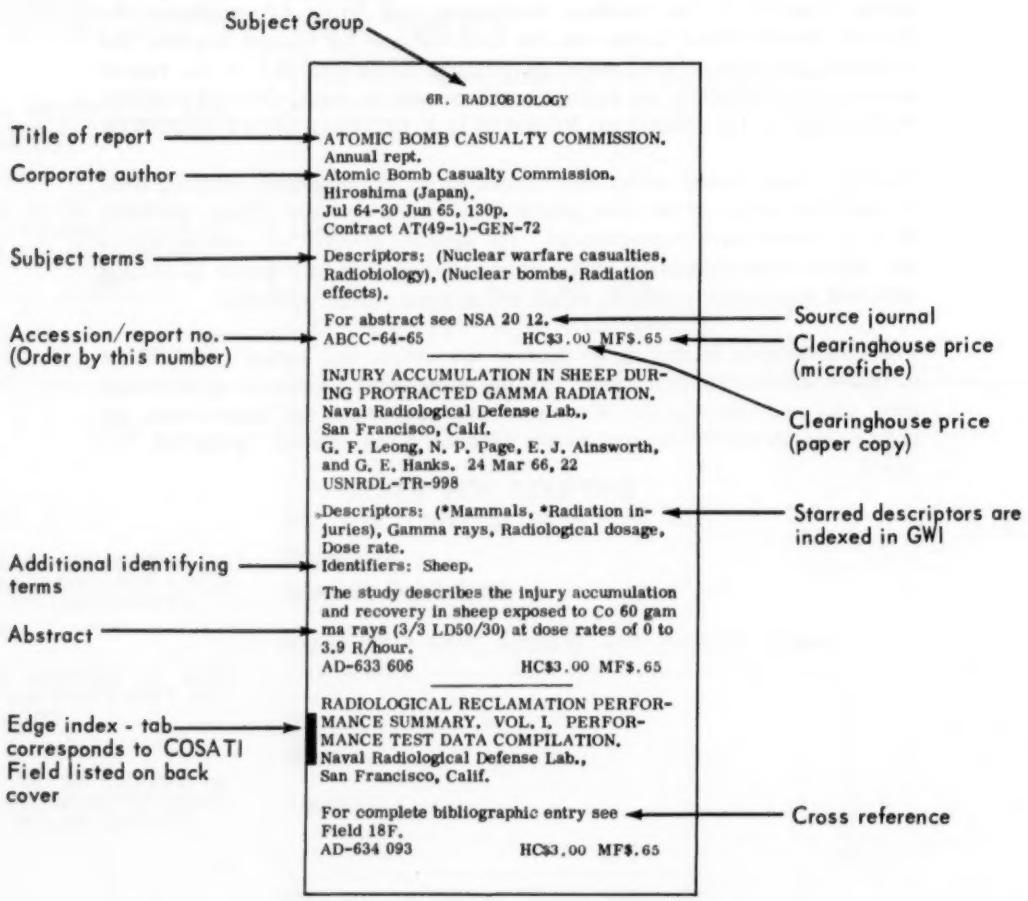
There are some format errors and inconsistencies in this journal resulting from the machine merger of the data generated by several agencies. Efforts are being made to correct these inconsistencies. The agencies involved are working with a task group of the Committee on Scientific and Technical Information to develop improved interagency standards which will eliminate these problems.

The Clearinghouse is striving to improve the content and format of USGRDR so that it will become increasingly valuable to the general public as an announcement tool and order guide. Comments and suggestions for improvement are invited and should be directed to the Director, Clearinghouse, Springfield, Va. 22151.

USGRDR FORMAT

Reports are announced under 22 subject categories called FIELDS. Each FIELD is divided into subcategories called GROUPS. Documents are listed alphanumerically by accession number within the GROUP. This classification system was adopted by the Committee on Scientific and Technical Information (COSATI) of the Federal Council on Science and Technology. The *COSATI Subject Category List* (AD–621 200) is available from the Clearinghouse at $3.00.

SAMPLE JOURNAL ENTRIES


Subject Group
6R. RADIOBIOLOGY
Title of report
ATOMIC BOMB CASUALTY COMMISSION. Annual rept.
Corporate author
Atomic Bomb Casualty Commission. Hiroshima (Japan).
Jul 64-30 Jun 65, 130p.
Contract AT(49-1)-GEN-72
Subject terms
Descriptors: (Nuclear warfare casualties, Radiobiology), (Nuclear bombs, Radiation effects).
For abstract see NSA 20 12.
Source journal
Accession/report no. (Order by this number)
ABCC-64-65 HC$3.00 MF$.65
Clearinghouse price (microfiche)
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INJURY ACCUMULATION IN SHEEP DURING PROTRACTED GAMMA RADIATION.
Naval Radiological Defense Lab., San Francisco, Calif.
G. F. Leong, N. P. Page, E. J. Ainsworth, and G. E. Hanks. 24 Mar 66, 22
USNRDL-TR-998
Descriptors: (*Mammals, *Radiation injuries), Gamma rays, Radiological dosage, Dose rate.
Starred descriptors are indexed in GWI
Additional identifying terms
Identifiers: Sheep.
Abstract
The study describes the injury accumulation and recovery in sheep exposed to Co 60 gamma rays (3/3 LD50/30) at dose rates of 0 to 3.9 R/hour.
AD-633 606 HC$3.00 MF$.65
Edge index - tab corresponds to COSATI Field listed on back cover
RADIOLOGICAL RECLAMATION PERFORMANCE SUMMARY, VOL. I, PERFORMANCE TEST DATA COMPILATION.
Naval Radiological Defense Lab., San Francisco, Calif.
For complete bibliographic entry see Field 18F.
Cross reference
AD-634 093 HC$3.00 MF$.65

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01 AERONAUTICS

Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE

Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS

Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES

Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES

Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES

Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.

07 CHEMISTRY

Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry.

08 EARTH SCIENCES AND OCEANOGRAPHY

Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.

09 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes components; computers; electronic and electrical engineering; information theory; subsystems; and telemetry.

10 ENERGY CONVERSION (Non-Propulsive)

Includes conversion techniques; power sources; and energy storage.

COSATI FIELD

11 MATERIALS

Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES

Includes mathematics and statistics and operations research.

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction equipment, materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering.

14 METHODS AND EQUIPMENT

Includes cost effectiveness; laboratories, test facilities, and test equipment; recording devices; reliability; and reprography.

15 MILITARY SCIENCES

Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY

Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles.

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection.

18 NUCLEAR SCIENCE AND TECHNOLOGY

Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear powerplants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology.

19 ORDNANCE

Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance.

20 PHYSICS

Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

21 PROPULSION AND FUELS

Includes air-breathing engines; combustion and ignition.

22 SPACE TECHNOLOGY

Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

RESEARCH highlights

Reports of current high industrial interest

Highlighted documents, unless otherwise designated, are sold at the new unit price of $3.00 each, 65 cents microfiche.

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Plastics

THE APPLICATION OF GLASS-REINFORCED PLASTIC HAS SHIFTED FROM A SECONDARY TO A PRIMARY ROLE AS A LOAD-CARRYING MATERIAL. This shift has made necessary a more thorough understanding of such material properties as static strength, fatigue strength, environmental and frequency effects, creep, stress rupture, and reinforcement configuration. Perhaps the most important consideration to an aircraft designer using glass-reinforced plastic is a knowledge of the fatigue limit of the material being considered along with criteria for determining when excessive fatigue damage has occurred. The designer of composite aircraft, however, has little if any directly applicable information on the various aspects of fatigue. In addition to this lack of data on the phenomenological behavior of composites, the problem of insufficient quality control consistantly has appeared. Nondestructive test methods for composite materials, though frequently sought, have not been readily available.

In order to make glass-reinforced plastic a more useful and reliable primary load-carrying material, the types of tests and the correlation of the test results with

simultaneously performed mechanistic studies must be analyzed in detail and placed on a firm basis. Because fatigue and creep properties of glass-reinforced plastics, isolated from the influences of previous static loading and environmental conditions, are somewhat academic in nature, the interaction of these influences with creep and fatigue must be determined. Finally, the sites of potential composite failure must be studied carefully in order to assess damage and establish part of the cumulative damage criteria for glass-reinforced plastic in aircraft design.

A report has been published that describes the work performed at the IIT Research Institute toward the realization of these objectives for a single resin system (epoxy) using uniaxial-roving and glass-cloth reinforcement. First the fatigue and creep properties of the reinforced plastics were established for various frequencies and amplitudes. Next the frequency results were analyzed, and representative frequencies were selected for cumulative-damage studies, including ultrasonic and macroscopic assessment of damage accrued in the course of a fatigue test. These studies also included determinations of the reduction in fatigue life at a given stress level by initially prefatiguing at lower or higher stress levels. In addition, the residual static load-carrying capability of prefatigued materials was determined. Where applicable, these cumulative damage data were correlated with the appropriate ultrasonic attenuated data and various theoretical bases commonly employed in metal-damage predictions. . . . . ORDER AD-652 415 -- AN INVESTIGATION OF THE FATIGUE AND CREEP PROPERTIES OF GLASS REINFORCED PLASTICS FOR PRIMARY AIRCRAFT STRUCTURES. . . . . K. E. Hofer, Jr., and E. M. Olsen, IIT Research Institute, for the Navy, Apr. 67, 257p.

Ceramics, Refractory Materials (Non-Metallic)

IMPROVEMENT OF THE STRENGTH AND THERMAL-SHOCK RESISTANCE OF POLYCRYSTALLINE CERAMIC MATERIALS has been the objective of much recent research. The effect of compressive surface layers on the strength of polycrystalline ceramic bodies is described in a report of research conducted at the Linden Laboratories in State College, Pa. Low-expansion surface layers were formed on conventional ceramics by high-temperature chemical reactions. During cooling after sintering it was observed that the main body contracted more than the surface layers, resulting in compressive stresses in the surfaces. Failure of the surface by shearing layers was prevented by establishing gradual compositional variations within the body. Chemical strengthening was attempted with alumina, titania, spinel, magnesia, forsterite, steatite, nickel oxide, silica, and cordierite bodies and was achieved with several of these materials. Combined processes involving chemical strengthening, atmospheric treatments, glazing, and quenching, in some cases, yielded strength increases of more than 90%. . . . . ORDER AD-652 399 -- CHEMICAL STRENGTHENING OF CERAMIC MATERIALS. . . . . H. P. Kirchner et al., Linden Labs., State College, Pa., for the Navy, Apr. 67, 156p.

Chemicals

THE CHEMISTRY AND ELECTROCHEMISTRY OF MOLTEN CARBONATES have received considerable attention during the past two decades because of their applicability in fuel-cell electrochemistry and in problems such as the electrochemical recovery of breathing oxygen from carbon dioxide. A survey of the recent contributions in this field has been conducted at Rensselaer Polytechnic Institute; particular emphasis has been directed to the classification of molten carbonates as solvent systems and as electrolytes. The thermodynamic and transport properties are first examined, then the development of the acid-base concept (as it relates to molten carbonates) and its application to corrosion chemistry. The report concludes with a discussion of the solubility of oxides in molten carbonates (cathodic phenomena) to illustrate the thermodynamic method in this area. . . . . ORDER AD-651 604 -- MOLTEN CARBONATE ELECTROLYTES AS ACID-BASE SOLVENT SYSTEMS. . . . . G. J. Janz, Rensselaer Polytechnic Inst., Troy, N. Y., for the Navy, Feb. 67, 84p.

Electrical

THE DEVELOPMENT OF ELECTRONIC DEVICES AND CIRCUITS THAT FUNCTION AT VERY LOW POWER LEVELS and utilize transistors which operate on current levels of 10^{-8} amperes have created the need for resistors having as high as 100 megohm resistance. Micropower resistors of 4.7, 10, 22, 47, and 100 megohms resistance have been prepared and tested by the Speer Carbon Co. The resistors, including substrate, were processed from raw materials to the finished product. Substrates were pressed, fired, and centerless ground to less than 50 mils diameter. Thallium oxide glaze resistive films were applied, fired, and helixed to desired resistance values. Lead wires were attached by percussive welding, and a conformal silicone coating was applied as an encapsulation. The report of this work includes discussions of the preparation of these resistors, the effects of the process variables, and the resistor properties; it also contains descriptions of the tests used. . . . . ORDER AD-653 630 -- RESISTORS FOR MICROPOWER CIRCUITS. . . . . C. F. Parks, Speer Carbon Co., Niagara Falls, N. Y., for the Army, May 67, 53p.

Engineering and Construction

AN ANALYSIS OF FIELD TESTS ON COMPACTION OF SUBGRADE SOILS is contained in the third volume of a three-volume report of soil-compaction studies recently completed by the IIT Research Institute. The objects of the research were to determine: (1) the desired characteristics of compacted soils, (2) the best method for measurement and specification of proper compaction, and (3) the effectiveness of various ways of achieving compaction. The first volume of the report contains the introduction and a description of the initial phases of the study, and the second volume

includes descriptions of the field-test apparatus and procedures. . . . . ORDER PB-174 878 -- SOIL COMPACTION STUDY, VOLUME III, ANALYSIS OF FIELD TESTS ON SUBGRADE SOILS. . . . . E. T. Selig et al., IIT Research Inst., Chicago, Ill., for Dept. of Commerce, Apr. 67, 165p. . . . . To receive the first and second volumes of this report ORDER:

PB-174 876 -- Same Title, VOLUME I, INTRODUCTION AND RESULTS OF INITIAL PHASES, Mar. 67, 196p.

PB-174 877 -- Same Title, VOLUME II, FIELD TEST APPARATUS AND PROCEDURES, Apr. 67, 164p.

Lubricants

A STUDY DESIGNED TO ACHIEVE HIGH RELIABILITY AND STABILITY FOR CONTACTS IN SLIDING-TYPE CONNECTIVE DEVICES OPERATING IN DRY-CIRCUIT CONDITIONS has recently been completed at the Stanford Research Institute. It was found that electrical contacts can be efficiently lubricated with solid organic compounds, which were found to be preferable to liquids. With octadecylamine hydrochloride as a model lubricant, the insertion forces of pin-and-socket type contacts were lowered; the durability at low friction was extended; unimpaired, low-contact resistance was retained; and destruction of the protective gold plating was either prevented or retarded. Gold, silver, copper, and certain alloys responded best to lubrication. The report includes procedures for the application of the model lubricant to several types of contacts and connectors, analytical methods for monitoring the coating, and suggestions for the modification of MIL-Connector specifications and failure criteria. . . . . ORDER AD-653 847 -- HIGH RELIABILITY CONNECTIVE DEVICES. . . . . G. Steinberg and M. Garrison, Stanford Research Inst., Menlo Park, Calif., for the Army, June 67, 164p.

Marine Technology

MANY MARINE ORGANISMS ARE CAPABLE OF SECRETING HIGH-POLYMER SUBSTANCES INTO THE SEA THAT EFFECTIVELY CHANGE THE TURBULENT-FRICTION RESISTANCE OF IMMERSED BODIES. The assumption that the great life processes of the ocean have no influence on ships other than the biological fouling of hulls has been generally valid; nevertheless, there have been some anomalies to this assumption: trials of supposedly identical sister ships, tested several months apart, have shown wide variations in power requirements for a given speed. In order to indicate the possible changes in resistance that might be encountered in the sea, experiments have been conducted with fresh-water and marine plankton cultures, as well as with larger algae, and friction reductions of as much as 65% have been recorded. A recently published report describes these experiments and presents information on the influences of the high-polymer substances on cavitation inception, appearance, and damage. The report also contains a discussion of some methods for detecting the

presence of algae-produced compounds and their effect on towing-tank, water-tunnel, and at-sea testing techniques. . . . . ORDER AD-654 570 -- THE INFLUENCE OF POLYMER-SECRETING ORGANISMS ON FLUID FRICTION AND CAVITATION. . . . . J. W. Hoyt, U. S. Naval Ordnance Test Station, China Lake, Calif., June 67, 26p.

Metalworking and Metal Forming

VELOCITY HAS BEGUN TO REPLACE MASS IN THE SHAPING OF METALS and has become one of the most significant trends in modern metal-forming techniques. This trend has been greatly accelerated by aerospace requirements for forming large structures to precise tolerances without loss of physical properties. A survey of high-velocity metalworking techniques (including theory, applications, and required apparatus) has been prepared and published by the Midwest Research Institute working under contract for NASA. In addition to a discussion of pertinent background material, the survey includes chapters on the following types of high-velocity metalworking techniques: electromagnetic, electrohydraulic, pneumatic-mechanical, and explosive. The survey also contains chapters on die design for high-velocity metalworking, material behavior at high strain rates, and trends and prospects for high-velocity metalworking. . . . . ORDER N67-26560 -- HIGH-VELOCITY METALWORKING, A SURVEY. . . . . M. C. Noland et al., Midwest Research Inst., Kansas City, Mo., for NASA, recd June 67, 187p.

Packaging and Containerization

THE COMPONENTS OF FLEXIBLE PACKAGING CONTAINERS, when exposed to the conditions of food processing or sterilization, are subject to migration or leaching into the food. A study has been completed of four different foil-laminated flexible-film materials potentially suitable for the packaging and heat processing of foods. The specific objectives were to determine the amount of film extractives which migrate into food-simulating solvents, the nature and source of these extractives, and the amount of volatile extractives that may be lost during the analysis of solvent extractives. The study was designed to provide information for developing methods with which to determine film extractives in fats or oils after high-temperature extractions of the film by fat and to establish a correlation between the amounts of solvent extractives obtained at 150°F to the amounts of fat extractives obtained at the highest temperatures compatible with the films. Extraction methods and results are presented for n-heptane and water-film extractions performed under varying conditions. The report also includes evaluations of microscopic alterations in film structure following solvent extractions, as well as several procedures for determining film extractives in fat. . . . . ORDER AD-640 522 -- MIGRATION OF FLEXIBLE PACKAGING COMPONENTS INTO FOODS. . . . . R. L. Ferm, The Pillsbury Co., Minneapolis, Minn., for the Army, June 66, 61p.

Physics

THE STUDY OF RADIATION HYDRODYNAMIC PROBLEMS INVOLVING AIR has greatly increased in importance during the past twenty years; this increase has led to the need for calculations of the thermodynamic and radiative properties of air. The Lockheed Aircraft Corporation has just released a series of books containing both theoretical and practical information on basic air properties. The first volume of this series is concerned with the thermodynamic properties of air as well as individual air constituents from 1000°K to 10^7°K for densities ranging between 10 and 10^{-7} times sea-level density, and it consists of text and tables. The text describes the techniques, models, and approximations used in the calculation of the tables. The second volume is concerned with all theoretical aspects of the transmission of thermal radiation in equilibrium air. The principal objective of this volume is the detailed description of models and approximations which were made in calculations of absorption coefficients for air and its constituents; Volume II contains chapters on Elementary Radiative Transfer, Theory of Radiation, Theory of Molecular Absorption, Research on Hot Gas Absorption Coefficients since 1900, General Features of Air Absorption Coefficients, Molecular Absorption Coefficients, and Atomic Absorption Coefficients. Volume III presents tables of equilibrium radiative properties of air and its constituents for a wide range of temperatures and densities. The information contained in these tables is a combination of experimental fact and theoretical computation. The contents of Volume III are divided into five parts: Part A is a summary of the entire field. Part B gives the basic data and references used in the preparation of the subsequent parts. Parts C, D, and E contain the absorption coefficients in the ranges 1000°K to 24,000°K (Part C), 1 eV to 20 eV (Part D), and above 20 eV (Part E). . . . .

ORDER: AD-654 054 -- THERMAL RADIATION PHENOMENA, VOL. I, THE EQUILIBRIUM THERMODYNAMIC PROPERTIES OF HIGH TEMPERATURE AIR, F. G. Gilmore, Lockheed Aircraft Corp., Palo Alto, Calif., for Dept. of Defense, May 67, 497p.

AD-654 055 -- Same Title. VOL. II, THE EQUILIBRIUM RADIATIVE PROPERTIES OF AIR -- THEORY, B. H. Armstrong and R. W. Nicholls, May 67, 340p.

AD-654 773 -- Same Title. VOL. III, TABLES OF RADIATIVE PROPERTIES OF AIR, H. Aroeste and J. L. Magee (Eds.), May 67, 638p.

Safety Engineering

A COORDINATED STUDY OF STOP-WARNING SYSTEMS FOR INTERSECTIONS ON RURAL HIGHWAYS has recently been completed by a University of Ohio research team working under the joint sponsorship of the Ohio Department of Highways and the U. S. Bureau of Public Roads. The published report contains the following elements:

(a) a statistical study of the effectiveness of different stop-warning systems in reducing the rate of accidents at rural intersections; (b) a similar study of the visual conspicuity of the flasher elements of stop-warning systems; (c) a field study of traffic-stream characteristics at intersections equipped with different stop-warning systems; and (d) a photometric survey of luminances at intersections equipped with different stop-warning systems. . . . . ORDER PB-174 723 -- A STUDY OF STOP-WARNING SYSTEMS. . . . . B. van den Branden et al., Univ. of Ohio, Columbus, for the Bureau of Public Roads, Mar. 67, 76p.

RESEARCH & DEVELOPMENT REPORTS

1. AERONAUTICS

1A. AERODYNAMICS

ONE-DIMENSIONAL UNSTEADY FLOW OF A RADIATING GAS.
Polytechnic Inst of Brooklyn N Y Dept of Aerospace Engineering and Applied Mechanics
For primary bibliographic entry see Field 20D.
AD-653 443 HC$3.00 MF$0.65

THE ACOUSTIC FIELD IN A CLOSED SPACE BEHIND A RECTANGULAR SIMPLY SUPPORTED PLATE EXCITED BY BOUNDARY LAYER TURBULENCE,
Navy Underwater Sound Lab New London Conn
For primary bibliographic entry see Field 20A.
AD-653 455 HC$3.00 MF$0.65

IRROTATIONAL FLOW OF FRICTIONLESS FLUIDS, MOSTLY OF INVARIABLE DENSITY.
David Taylor Model Basin Washington D C
For primary bibliographic entry see Field 20D.
AD-653 463 HC$3.00 MF$0.65

PHYSICAL GAS DYNAMICS, HEAT TRANSFER AND THERMODYNAMICS OF HIGH TEMPERATURE GASES: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-653 513 HC$3.00 MF$0.65

CONCERNING THE PROBLEM OF THE FLOW OF A HYPERSONIC STREAM OF GAS AROUND A THIN BODY,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-653 547 HC$3.00 MF$0.65

WIND TUNNEL TEST REPORT CONVENTIONAL MODEL. VOLUME I. LOW SPEED FORCE AND MOMENT DATA.
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept
Jan 64, 414p Rept no. 141-Vol-1
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Flight Research Aircraft Program. See also Volume 2, AD-653 568 and Volume 3, AD-653 569.

Descriptors: (*Vertical take-off planes, Subsonic characteristics), (*Research planes, Model tests), Wind tunnel models, Ducted fans, Lift, Force (Mechanics), Moments, Tables.
Identifiers: V-5 aircraft.

The report presents the results from the wind tunnel tests of a 1/8-scale conventional model of the U. S. Army XV-5A Lift Fan Flight Research Aircraft. The tests were performed to determine the subsonic aerodynamic characteristics of the XV-5A in its conventional flight configuration. Volume I contains the tabulated force and moment data from the low speed (M = 0.285) tests.
AD-653 566 HC$3.00 MF$0.65

WIND TUNNEL TEST REPORT CONVENTIONAL MODEL. VOLUME II. LOW SPEED PRESSURE AND HINGE MOMENTS.
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept
Jan 64, 344p Rept no. 141-Vol-2
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Flight Research Aircraft Program. See also volume 1, AD-653 566 and volume 3, AD-653 569.

Descriptors: (*Vertical take-off planes, Model tests), (*Research planes, Model tests), Moments, Pressure, Wind tunnel models, Lift, Ducted fans, Tables, Aerodynamic control surfaces, Aerodynamic characteristics.
Identifiers: V-5 aircraft.

The report presents the results from wind tunnel tests of a one-eighth scale conventional model of the U. S. Army XV-5A Lift Fan Flight Research Aircraft. Volume II presents hinge moment coefficients and pressure data in plotted and tabular form with pertinent detail explanatory information. Pressure and hinge moment data were not recorded during the second phase of the low speed testing. (Author)
AD-653 568 HC$3.00 MF$0.65

WIND TUNNEL TEST REPORT CONVENTIONAL MODEL. VOLUME III. HIGH SPEED (MACH = 0.4 TO 0.9).
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept

Jan 64, 547p Rept no. 141-Vol-3
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Flight Research Aircraft Program. See also Volume 1, AD-653 566 and Volume 2, AD-653 568.

Descriptors: (*Vertical take-off planes, Subsonic characteristics), (*Research planes, Model tests), Wind tunnel models, Lift, Ducted fans, Aerodynamic control surfaces, Moments, Aerodynamic configurations, Tables.
Identifiers: V-5 aircraft.

The volume presents the results of high speed wind tunnel test of a one-eighth scale model of the U.S. Army XV-5A Lift Fan Research Aircraft. The tests were conducted at the David Taylor Model Basin 7 x 10 foot Transonic Wind Tunnel Facility. Conventional model force, pressure, and hinge moment data were obtained over a Mach number range of .40 to .90 and pitch and sideslip ranges of -4 to 15 degrees and -5 to +5 degrees respectively. The complete aircraft was the primary configuration tested, with the majority of the variations being in control surface and stabilizer settings. Tests were also conducted with the vertical and horizontal tail surfaces removed, with wing fan upper and lower surface strut fairings removed, and with engine duct pressure survey rake installed. (Author)
AD-653 569 HC$3.00 MF$0.65

AN APPROXIMATE SOLUTION OF VON MISES' BOUNDARY LAYER EQUATION,
New York Univ N Y
For primary bibliographic entry see Field 20D.
AD-653 586 HC$3.00 MF$0.65

AN EXPERIMENTAL STUDY OF SUPERSONIC FLOW OVER A REARWARD FACING STEP.
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-653 654 Not available from CFSTI.

THE EFFECT OF WALL TEMPERATURE ON THE LOW REYNOLDS NUMBER HYPERSONIC STAGNATION REGION SHOCK LAYER.
Princeton Univ N J Gas Dynamics Lab
For primary bibliographic entry see Field 20D.
AD-653 659 Not available from CFSTI.

AERODYNAMICS OF OSCILLATING DISKS AND A RIGHT-CIRCULAR CYLINDER,
Michigan Univ Ann Arbor Dept of Aerospace Engineering
For primary bibliographic entry see Field 20D.
AD-653 662 Not available from CFSTI.

ATTENUATION OF A SHOCK WAVE DUE TO THE NONEQUILIBRIUM IONIZATION AND RADIATION.
General Dynamics/Convair San Diego Calif
For primary bibliographic entry see Field 20D.
AD-653 679 Not available from CFSTI.

HIGH ALTITUDE ROCKET PLUME STRUCTURE.
General Dynamics/Convair San Diego Calif
For primary bibliographic entry see Field 20D.
AD-653 769 HC$3.00 MF$0.65

SEPARATED FLOWS, A ROUND TABLE DISCUSSION,
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 20D.
AD-653 841 HC$3.00 MF$0.65

DARE SUPPORT PACKAGE,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 9B.
AD-653 854 HC$3.00 MF$0.65

SYNOPSIS OF A THEORY FOR SHOCK IMPEDANCE EFFECTS IN A ROUGH-WALLED TUNNEL.
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
For primary bibliographic entry see Field 20D.
AD-653 860 HC$3.00 MF$0.65

TRANSIENT TEMPERATURE DISTRIBUTION IN A SOLID SPHERE DUE TO AERODYNAMIC HEATING,
Polytechnic Inst of Brooklyn N Y Dept of Aerospace Engineering and Applied Mechanics
For primary bibliographic entry see Field 20D.
AD-653 873 HC$3.00 MF$0.65

SOME PRELIMINARY EXPERIMENTS ON PROBE INTERFERENCE IN HYPERSONIC NEAR WAKES,
Polytechnic Inst of Brooklyn N Y Dept of Aerospace Engineering and Applied Mechanics
For primary bibliographic entry see Field 20D.
AD-653 875 HC$3.00 MF$0.65

FLIGHT EXPERIENCE WITH THE OGEE WING AT LOW SPEED,
Advisory Group for Aerospace Research and Development Paris (France)
Fred J. Drinkwater, III, and L. Stewart Rolls.
May 66, 26p Rept no. AGARD-538
NATO Furnished. Presented to the Flight Mechanics Panel of AGARD, Paris (France, 10-13 May 66).

Descriptors: (*Varying sweep wings, Flight testing), Leading edge, Aircraft, Vortices, Roll, Lift, Drag, Pitch (Motion), Handling, Ground effect, Velocity, Aircraft landings, Approach, Flight paths, Delta wings.

A basic delta-wing aircraft was modified to an Ogee plan form and tested in flight following full-scale wind-tunnel tests. The modified wing had a sharp leading edge compared to the original large-radius, slatted leading edge. The modification produced strong leading-edge vortices which were easily observed and photographed as condensation trails. The stability of the vortices was examined in flight to 25 degrees angle of attack and 8 degrees sideslip and no detachment of the vortices or other discontinuous characteristics were indicated. A significant improvement in lateral-directional stability over that of the basic airplane was obtained at high angles of attack, which allowed

a reduction in the minimum instrument approach speed. The improved lateral-directional characteristics made it possible to extend to lower speeds the study of other piloting factors which might determine the minimum approach speed. The effects of a range of static margins from -0.02 to +0.02 were examined. Also, the effect of a change in the slope of the power-required curve, which was obtained by making landing approaches over a range of airspeeds, was investigated. Poor static longitudinal stability and reduced flight-path-angle control became the limiting factors. (Author)
AD-653 927 HC$3.00 MF$0.65

EXPERIMENTAL DETERMINATION OF THE LAW OF HEAT EXCHANGE FOR THE TURBULENT BOUNDARY LAYER IN A SUPERSONIC FLOW,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20M.
AD-653 956 HC$3.00 MF$0.65

THEORETICAL AND EXPERIMENTAL STUDIES OF LAMINAR FLOW SEPARATION ON FLAT PLATE-WEDGE COMPRESSION SURFACES IN THE HYPERSONIC STRONG INTERACTION REGIME.
Cornell Aeronautical Lab Inc Buffalo N Y
For primary bibliographic entry see ield 20D.
AD-653 985 HC$3.00 MF$0.65

RESEARCH ON MIXING OF COAXIAL STREAMS.
Illinois Inst of Tech Chicago Dept of Mechanical and Aerospace Engineering
For primary bibliographic entry see Field 20D.
AD-654 014 HC$3.00 MF$0.65

A REVIEW OF SOME RECENT PROGRESS IN UNDERSTANDING CATASTROPHIC YAW,
Notre Dame Univ Ind Dept of Aero-Space Engineering
For primary bibliographic entry see Field 20D.
AD-654 035 HC$3.00 MF$0.65

FLIGHT-MEASURED TURBULENCE IN THE NATO NATIONS,
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 1C.
AD-654 037 HC$3.00 MF$0.65

FULL SCALE WIND TUNNEL TEST REPORT.
General Electric Co Cincinnati Ohio Advanced Technology and Demonstrator Programs Dept
Jun 66, 303p Rept no. 153
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Flight Research Aircraft Program.

Descriptors: (*Vertical take-off planes, Flight testing), (*Research planes, Flight testing), Wind tunnels, Hovering, Aerodynamic characteristics, Thermodynamics, Performance (Engineering), Lift, Propulsion, Fans.
Identifiers: V-5 aircraft.

The test program included aerodynamic, thermodynamic and mechanical evaluation of the complete flight type aircraft system at flight speeds equivalent to hover up through 100 knots in both the conventional and fan power modes of flight. The report summarizes the more important aerodynamic performance obtained during the test program. The data are presented graphically in coefficient form to provide a consistent basis of comparison. The aerodynamic results obtained during these tests may be summarized by saying that the aircraft, as designed and tested, has adequate control power, lift, horizontal thrust and static stability to permit safe transitional flight between a hover lift-off and conversion to the jet mode of flight. The results of this wind tunnel test program have proven to be a valuable asset during conduct of the flight test program. Using these data, predictions of aircraft performance have been verified by actual measured flight data. (Author)
AD-654 043 HC$3.00 MF$0.65

EQUILIBRATION OF A SINGLE-SPECIES TWO-TEMPERATURE GAS MIXTURE,
Northwestern Univ Evanston Ill Technological Inst
For primary bibliographic entry see Field 20D.
AD-654 096 Not available from CFSTI.

HEAT TRANSFER AND BINARY DIFFUSION WITH THERMODYNAMIC coupling in variable-PROPERTY FORCED CONVECTION ON A FLAT PLATE.
Clarkson Coll of Technology Potsdam N Y
For primary bibliographic entry see Field 20M.
AD-654 141 Not available from CFSTI.

FREE-FLIGHT MODEL MEASUREMENTS OF THE DYNAMIC STABILITY OF A SUPERSONIC STRIKE AIRCRAFT (TSR2).
Royal Aircraft Establishment, Farnborough (England).
G. K. Hunt. Nov 65, 84p RAE-TR-65253

Descriptors: *Bac tsr 2 aircraft, *Free flight, *Lateral stability, *Longitudinal stability, Aircraft, Computer, Dynamic, Engine, Failure, Flight, Free, Lateral, Longitudinal, Model, Scale, Sideslip, Simulation, Stability, Yaw.

For abstract, see STAR 05 15.
N67-27798 HC$3.00 MF$0.65

APPROXIMATE CALCULATIONS OF THE IMCOMPRESSIBLE LAMINAR BOUNDARY LAYER.
Aeronautical Research Council (Gt. Brit.)
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 15.
N67-27872 HC$3.00 MF$0.65

AN EXPERIMENTAL STUDY OF THE TANGENTIAL VELOCITY PROFILE IN THE RANQUE-HILSCH VORTEX TUBE.
Atomic Energy Commission Research Establishment, Riso (Denmark).
C. U. Linderstroem-lang. Sep 65, 18p RISO-116

Descriptors: *Pressure measurement, *Static pressure, *Velocity profile, *Vortex tube, *Wall pressure, Distribution, Flow, Gas, Measurement, Pressure, Profile, Separation, Static, Tangent, Tube, Velocity, Vortex, Wall.

For abstract, see STAR 05 15.
N67-27934 HC$3.00 MF$0.65

THE DETERMINATION OF THE THERMODYNAMIC STATE OF RELAXING HYPERSONIC GAS FLOWS BY ELECTRON BEAM TECHNIQUE.
Die Bestimmung des Thermodynamischen Zustandes Relaxierender Hypersonischer Gasstroemungen D rch Elektronenstossanregung
Aerodynamische Versuchsanstalt, Gottingen (West Germany). Abteilung Aerodynamik.
K. Buetefisch. Sep 66, 40p DGRR/WGLR PAPER-66-114, AVA-FB-6611
in German, English Summary Presented At the Ann. Joint Meeting grr/Wglr, Bad Godesberg, W. Germany, Oct. 1966

Descriptors: *Electron beam, *Gas flow, *Hypersonic flow, *Vibrational relaxation, Beam, Conference, Density, Electron, Enthalpy, Flow, Gas, Hypersonic, Measurement, Pressure, Raman spectroscopy, Relaxation, Spectrograph, Stagnation, Temperature, Thermodynamics, Tunnel, Vibration, Wind.

For abstract, see STAR 05 15.
N67-27935 HC$3.00 MF$0.65

THE BEHAVIOUR AT INFINITY OF SYMMETRIC SONIC FLOW.
Royal Aircraft Establishment, Farnborough (England).
D. G. Randall. Feb 66, 31p RAE-TR-66030

Descriptors: *Sonic flow, *Two-dimensional body, *Velocity potential, Body, Coefficient, Dimensional, Disturbance, Expansion, Flow, Polynomial, Potential, Sonic, Symmetry, Two, Velocity.

For abstract, see STAR 05 15.
N67-28070 HC$3.00 MF$0.65

SIX-COMPONENT LOW-SPEED TUNNEL TESTS OF JET- FLAP COMPLETE MODELS WITH VARIATION OF ASPECT RATIO, DIHEDRAL, AND SWEEPBACK, INCLUDING THE INFLUENCE OF GROUND PROXIMITY.
Aeronautical Research Council (Gt. Brit.)
S. F. Butler, M. B. Guyett, and B. A. Moy. 1967, 6p ARC-R+M-3441, RAE-AERO-2652

Descriptors: *Aerodynamic force, *Aspect ratio, *Dihedral effect, *Jet flap, *Sweepback, *Wind tunnel stability test, Aerodynamic, Aspect, Component, Dihedral, Effect, Flap, Force, Jet, Low speed, Ratio, Six, Stability, Test, Tunnel, Variation, Wind.

For abstract, see STAR 05 15.
N67-28172 HC$3.00 MF$0.65

STUDY OF THE FLOW DISTRIBUTION IN A TWO- CHANNEL TEST SECTION.
Societe Nationale D Etude Et de Construction de Moteurs D Aviation, Suresnes (France). Division Atomique.
10 Feb 66, 40p EURAEC-1611, EUR-2824
Contract EURATOM-061-64-7-TEEF/D/
Its Spec. Rept.-24

Descriptors: *Channel, *Flow distribution, *Vortex flow, Air, High, Intensity, Interface, Length, Low, Mass, Parallel, Test, Transfer, Two, Velocity.

For abstract, see STAR 05 15.
N67-28210 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF NONEQUILIBRIUM CORNER EXPANSION FLOWS OF DISSOCIATED OXYGEN.
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
J. E. Drewry. May 67, 114p UTIAS-124, AFOSR-67-0554
Contract AF-AFOSR-67-0554

Descriptors: *Gas expansion, *Nonequilibrium flow, *Oxygen, Boundary, Density, Dimensional, Dissociation, Expansion, Flow, Gas, Hypersonic, Layer, Mach-zehnder interferometer, Measurement, Nonequilibrium, Piezoelectricity, Pressure, Shock, Transducer, Tube, Two, Wave.

For abstract, see STAR 05 15.
N67-28617 HC$3.00 MF$0.65

THE PERTURBATION VELOCITIES IN THE CHORDWISE AND SPANWISE DIRECTION FOR THIN RECTANGULAR WINGS OF LOW ASPECT RATIO WITHOUT LIFT IN COMPRESSIBLE SUBSONIC FLOW.

Die Stoergeschwindigkeiten in Stroemungs- Und Spannweitenrichtung Fuer Duenne Rechteckflue-Gel Kleiner Streckung Ohne Auftrieb in Kompressibler Unterschallstroemung
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Porz (West Germany). Institut Fuer Angewandte Gasdynamik.
H. Krueger. Mar 67, 32p DLR-FB-67-18, DVL-632
in German, English Summary

Descriptors: *Low aspect ratio wing, *Perturbation, *Rectangular wing, *Subsonic flow, *Velocity, Chordwise, Compressible, Direction, Flow, Lift, Low aspect, Point, Ratio, Rectangle, Spanwise, Stagnation, Subsonic, Thickness, Thin, Wing.

For abstract, see STAR 05 15.
N67-28668 HC$3.00 MF$0.65

LOW-SPEED TESTS OF AN ALL-FLEXIBLE PARAWING FOR LANDING A LIFTING-BODY SPACECRAFT.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
F. M. Bugg, and W. C. Sleeman, Jr., Jun 67, 18p
NASA-TN-D-4010
Contract 124-07-03-22-23

Descriptors: *Aerodynamic characteristics, *Flexible wing, *Lifting body, *Parawing, Aerodynamic, Angle of attack, Body, Characteristics, Coefficient, Configuration, Control, Drag, Flexible, Flight, Lift, Lifting, Model, Stability, Static, Test, Tunnel, Wind, Wing.

For abstract, see STAR 05 15.
N67-28757 HC$3.00 MF$0.65

THE HYPERSONIC LOW DENSITY WIND TUNNEL OF THE AERODYNAMISCHE VERSUCHSANSTALT GOETTINGEN - OPERATIONAL BEHAVIOR AND FIRST RESULTS ON REAL GAS EFFECTS IN NOZZLE FLOWS.
Der Hypersonische Vakuumwindkanal Der Aerodynamischen Versuchsanstalt Goettingen - Betriebsverhalten Und Erste Ergebnisse Ueber Reale Gaseffekte in Duesenstroemungen
Aerodynamische Versuchsanstalt, Gottingen (West Germany). Abteilung Raumfahrt-aerodynamik.
G. Koppenwallner. Sep 66, 34p AVA-FB-6612
in German, English Summary Presented At the Ann. Joint Meeting grr/Wglr, Bad Godesberg, W. Germany, Oct. 1966 Its Meeting Paper No. 66-113

Descriptors: *Low density wind tunnel, *Nozzle flow, *Real gas, Condensation, Conference, Distribution, Effect, Flow, Gas, Hypersonic, Low density, Measurement, Nozzle, Pressure, Real, Recovery, Stagnation, Static, Temperature, Tunnel, Wind.

For abstract, see STAR 05 15.
N67-28805 HC$3.00 MF$0.65

CALCULATION OF THE LOAD DISTRIBUTION, AT SUPERSONIC SPEEDS, ON A SWEPTBACK WING OF ARBITRARY PLANFORM.
Royal Aircraft Establishment, Farnborough (England).
G. M. Roper. Nov 66, 57p RAE-TR-66356

Descriptors: *Load distribution, *Supersonic flow, *Sweptback wing, *Wing loading, Aircraft, Computation, Computer, Digital, Distribution, Disturbance, Edge, Flow, Leading, Lift, Load, Loading, Speed, Subsonic, Supersonic, Sweepback, Trailing, Wake.

For abstract, see STAR 05 15.
N67-28924 HC$3.00 MF$0.65

ON THE SIGNIFICANCE OF THE SUPPORTS WHEN CALIBRATING STRAIN GAUGE INSTALLATIONS FOR MEASURING LOADS ON AIRCRAFT.
Royal Aircraft Establishment, Farnborough (England).
D. A. Drane. Sep 66, 12p RAE-TR-66293

Descriptors: *Calibration, *Loading, *Strain gauge, *Support, Aircraft, Distribution, Flight, Gauge, Ground, Strain, Structure, Test.

For abstract, see STAR 05 15.
N67-28926 HC$3.00 MF$0.65

1B. AERONAUTICS

EVALUATION OF HEAD AND FACE INJURY POTENTIAL OF CURRENT AIRLINE SEATS DURING CRASH DECELERATIONS,
Civil Aeromedical Inst Oklahoma City Okla
For primary bibliographic entry see Field 1C.
AD-653 869 HC$3.00 MF$0.65

THE PROTECTION OF A AND A. E. E. WIRE AND OPTICAL TRACE ACCIDENT RECORDERS.
Aeroplane and Armament Experimental Establishment, Boscombe Down (England).
G. H. Hillier. 9 May 66, 25p AAEE/TECH/294/WEA

Descriptors: *Aircraft accident, *Protection, *Recording instrument, Accident, Aircraft, Crash, Damage, Impact, Instrument, Optical, Recording, Recovery, Test, Wire.

For abstract, see STAR 05 15.
N67-27791 HC$3.00 MF$0.65

FOG DISPERSAL OVER AIRPORT RUNWAYS BY MEANS OF A MECHANICAL METHOD.
Deutsche Versuchsanstalt Fuer Luft- Und Raumfahrt, Troisdorf (West Germany).
For primary bibliographic entry see Field 4B.
For abstract, see STAR 05 15.
N67-28676 HC$3.00 MF$0.65

AVIONICS REQUIREMENTS FOR ALL WEATHER LANDING OF ADVANCED S S T'S. VOLUME I - ANALYSIS OF SYSTEM CONCEPTS AND OPERATIONAL PROBLEMS FINAL REPORT.
Sperry Phoenix Co., Ariz.
S. S. Osder. Apr 67, 119p NASA-CR-73092
Contract NAS2-4124

Descriptors: *All-weather air navigation, *Avionics, *Instrument landing system, *Supersonic transport, All-weather, Computer, Concept, Control, Equipment, Instrument, Landing, Navigation, Operation, Runway, Supersonic, System, Transport.

For abstract, see STAR 05 15.
N67-28753 HC$3.00 MF$0.65

AVIONICS REQUIREMENTS FOR ALL WEATHER LANDING OF ADVANCED S S T'S. VOLUME III - SPECIFIC PROBLEMS OF AN SST AND RELATED TECHNOLOGICAL TRENDS FINAL REPORT.
Sperry Phoenix Co., Ariz.
S. S. Osder. Apr 67, 85p NASA-CR-73094
Contract NAS2-4124

Descriptors: *All-weather air navigation, *Automatic landing system, *Avionics, *Handling quality, *Supersonic transport, Air, Aircraft, All-weather, Automatic, Computer, Control, Digital, Flight, Handling, Landing, Navigation, Quality, Reliability, Supersonic, System, Transport.

For abstract, see STAR 05 15.
N67-28794 HC$3.00 MF$0.65

A NOTE ON ROTARY WING HOVERING AND TAKE- OFF PERFORMANCE, DATA ACQUISITION AND ANALYSIS.
Advisory Group for Aerospace Research and Development, Paris (France).
J. C. Kidwell. Oct 65, 17p AGARD-517
Presented At the 27th Meeting of the Agard Flight Mech. Panel, Rome, 11-12 Oct. 1965

Descriptors: *Data analysis, *Hovering, *Rotary wing aircraft, *Takeoff, *Test method, Accuracy, Acquisition, Aircraft, Analysis, Data, Helicopter, Method, Performance, Rotary, Technique, Test, Tethering, Wing.

For abstract, see STAR 05 15.
N67-28878 HC$3.00 MF$0.65

APPLICATION OF THE MODEL TECHNIQUE TO A VARIABLE-STABILITY HELICOPTER FOR SIMULATION OF VTOL HANDLING QUALITIES.
Advisory Group for Aerospace Research and Development, Paris (France).
J. F. Garren, Jr., and J. R. Kelly. Oct 65, 24p
AGARD-515
Presented At the 27th Meeting of the Agard Flight Mech. Panel, Rome, 11-12 Oct. 1965

Descriptors: *Computer simulation, *Flight simulation, *Helicopter performance, *Vtol, Analog, Computer, Equation, Flight, Handling, Helicopter, Landing, Model, Performance, Simulation, Stability, Takeoff, Technique, Test, Variable, Vertical.

For abstract, see STAR 05 15.
N67-28879 HC$3.00 MF$0.65

1C. AIRCRAFT

ON THE FLEXIBLE-FLAP DAMPER FOR AIR-CUSHION VEHICLES.
Technical rept.,
Hydronautics, Inc., Laurel, Md.
C. C. Hau. May 64, 32p TR-347-1
Contract NObs-88272

Descriptors: (*Ground effect machines, Aerodynamic characteristics), Damping, Flexible structures, Flaps, Analysis, Oscillation, Configuration.

An approximate analysis of the general dynamic characteristics of a two-dimensional air-cushion craft with hinged flexible flaps, employing lumped-parameter assumptions, is made. The free oscillation system is, in general, stable. With the proper selection of inertia stiffness, flap damping, and geometrical configuration, the flexible flap may effectively be used as a forced motion damper. (Author)
AD-454 969 HC$3.00

FUSELAGE STRUCTURAL ANALYSIS. VOLUME I. SHEAR AND BENDING.
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept
Feb 64, 235p Rept no. 144-Vol-I
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Flight Research Aircraft Program. See also Volume 2, AD-653 564.

Descriptors: (*Vertical take-off planes, Fuselages), (*Research planes, Fuselages), (*Fuselages, Structural properties), Shear stresses, Bending, Lift, Ducted fans, Analysis, Loading (Mechanics), Tables.
Identifiers: V-5 aircraft.

The final stress analysis of the U. S. Army XV-5A lift fan research aircraft forward and aft fusel-

age sections is presented. The forward and aft sections of the fuselage are conventional aircraft semimonocoque structures, and the center section is a welded tubular space truss. The analysis of the longitudinal bending members and skins or webs is contained. The primary intent of the report is to provide a tabulation of internal shear and bending stress distributions for the final critical loading conditions. Critical margins of safety of primary components are computed. Structural adequacy was also demonstrated by proof tests simulating the critical conditions. All loads shown are ultimate values. (Author)
AD-653 563 HC$3.00 MF$0.65

FUSELAGE STRUCTURAL ANALYSIS. VOLUME II. CENTER FUSELAGE AND ENGINE MOUNTS.
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept
Feb 64, 438p Rept no. 144-Vol-2
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Flight Research Aircraft Program. See also Volume 1, AD-653 563.

Descriptors: (*Vertical take-off planes, Fuselages), (*Research planes, Fuselages), (*Fuselages, Structural properties), (*Engine mounts, Structural properties), Aircraft engines, Analysis, Lift, Ducted fans, Propulsion, Supports, Loading (Mechanics), Engine structures, Exhaust pipe1 Tables.
Identifiers: V-5 aircraft.

The structural analyses of the fuselage space frame, engine mounts and the propulsion system supports of the U. S. Army XV-5A Lift Fan Research Aircraft are presented. The space frame internal loads analysis was performed utilizing the IBM 704 computer program developed in conjunction with the XV-5A wing basic components analysis. Therefore, much of the report is made up of the deflections and internal member loads program output for the several loading conditions investigated. The space frame member critical loads are summarized and member allowables and margins of safety are presented. The propulsion system, including crossover ducts, tailpipe and forward engine support is reviewed and supporting structure analyzed for critical loading conditions. (Author)
AD-653 564 HC$3.00 MF$0.65

STRUCTURAL ANALYSIS WING BASIC COMPONENTS.
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept
Oct 63, 398p Rept no. 130
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Flight Research Aircraft Program.

Descriptors: (*Vertical take-off planes, Wings), (*Research planes, Wings), (*Wings, Structural properties), Analysis, Lift, Ducted fans, Structural parts, Stresses, Loading (Mechanics), Tables.
Identifiers: V-5 aircraft.

The structural analysis of the basic wing components of the U. S. Army XV-5A Lift Fan Research Aircraft is presented. The basic structural components of the wing are composed of the two spars, the wing leading edge torque box, and the skins and ribs of the panel outboard of the lift fan. A complete digital computer program applicable to this and other highly redundant structures was developed. Since this program was used in the structural analysis and design, the deflections, internal loads, and internal stresses for critical flight conditions are summarized in the form of printed computer output. (Author)
AD-653 565 HC$3.00 MF$0.65

WIND TUNNEL TEST REPORT CONVENTIONAL MODEL. VOLUME I. LOW SPEED FORCE AND MOMENT DATA.
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept
For primary bibliographic entry see Field 1A.
AD-653 566 HC$3.00 MF$0.65

WIND TUNNEL TEST REPORT CONVENTIONAL MODEL. VOLUME II. LOW SPEED PRESSURE AND HINGE MOMENTS.
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept
For primary bibliographic entry see Field 1A.
AD-653 568 HC$3.00 MF$0.65

WIND TUNNEL TEST REPORT CONVENTIONAL MODEL. VOLUME III. HIGH SPEED (MACH = 0.4 TO 0.9).
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept
For primary bibliographic entry see Field 1A.
AD-653 569 HC$3.00 MF$0.65

SYNTHESIS OF FLIGHT CONTROL SYSTEMS SUBJECT TO VEHICLE PARAMETER VARIATIONS.
Final rept., Jan 66-Jan 67,
Grumman Aircraft Engineering Corp Bethpage N Y Research Dept
Eliezer Kreindler. Apr 67, 179p
AFFDL-TR-66-209
Contract AF 33 (615)-3411

Descriptors: (*Flight control systems, *Synthesis), Sensitivity, Optimization, Numerical analysis, Tables, Theory.

The main objective of this report is to investigate the potentials of adding sensitivity terms into the performance index to be optimized in order to achieve a reduction in sensitivity to plant parameter-deviations. The secondary objective is to survey the literature on methods of sensitivity reduction and on sensitivity in optimal control theory. (Author)
AD-653 600 HC$3.00 MF$0.65

SOME DESIGN PRINCIPLES OF GROUND EFFECT MACHINES SECTION F - CUSHION CONTRIBUTIONS TO STABILITY.
Research and development rept.,
David Taylor Model Basin Washington D C Aerodynamics Lab
Harvey R. Chaplin, and Allen G. Ford. Feb 67, 40p Rept no. Aero-1100F
DTMB-2121F
See also AD-636 277; AD-640 015.

Descriptors: (*Ground effect machines, Design), (*Ground effect, Stability), Pitch (Motion), Roll, Damping, Mathematical analysis.

A review is undertaken of some of the more important elementary relationships which determine the influence of the air cushion on the pitch, heave, and roll stability of ground effect machines. The analyses presented yield only rough approximations of the quantities needed for design. Further, the analyses are restricted to cases of vehicles which are not in contact with the surfaces over which they travel, whereas the influences of surface contact are of primary importance in most practical problems. (Author)
AD-653 859 HC$3.00 MF$0.65

EVALUATION OF HEAD AND FACE INJURY POTENTIAL OF CURRENT AIRLINE SEATS DURING CRASH DECELERATIONS.
Civil Aeromedical Inst Oklahoma City Okla
John J. Swearingen. Jun 66, 20p
FAA-AM-66-18

Descriptors: (*Aircraft seats, *Aviation accidents), Head, Wounds + injuries, Crash injuries, Deceleration, Aviation safety, Impact shock, Design.

A large percentage of deaths in commercial-airline crashes is produced as the body and lower limbs flail around the seat belt. According to a previous study, a 10-foot-diameter sphere of clear area would be necessary to prevent a person from striking some portion of his body against surrounding structures. This study is concerned primarily with head impacts that may occur against most portions of the seats. Thirty-five impact studies were made with an instrumented dummy head against various portions of eight different makes of airline seats to determine the 'g' time-force parameters of metal deformation and seat break-over. Until recently these data could not be interpreted in terms of head injury or unconsciousness because data on human tolerance to impact against deformable structures were not available; however, a recently published study presents detailed data concerning these tolerances. These data are used here to determine the injury potential of the eight seats studied. Applying the earlier data to the seat-impact studies, 30% of these impacts would have produced fatal head injuries, 80% would have caused facial fractures, 97% would have rendered the passenger unconscious, and only 3% would have caused no injury or unconsciousness. (Author)
AD-653 869 HC$3.00 MF$0.65

APPLICATION OF APPLIED-LOAD-RATIO STATIC-TEST SIMULATION TECHNIQUES TO FULL-SCALE STRUCTURES. VOLUME III. EXPERIMENTAL PROGRAM.
Naval Air Engineering Center Philadelphia Pa Aeronautical Structures Lab
E. Alter. Feb 67, 64p Rept no. NAEC-ASL-1094-Vol-3
See also Volume 2, AD-631 660 and Volume 4, AD-648 746.

Descriptors: (*Airframes, Loading (Mechanics)), Stabilizers (Horizontal tail surface), Simulation, Test methods, Failure (Mechanics), Deformation, Stresses, Structural properties, Temperature, Joints.
Identifiers: U-3 aircraft.

The report covers the experimental portion of the current investigation. A total of 14 tests were performed on seven F8U-3 horizontal stabilizers. Specimens were loaded twice to fail in bending: first in the outboard structure, and then in the inboard splice joint. Prescribed load-time and temperature-time programs were automatically controlled. Four steady-state elevated temperature environments were used consisting of uniform and nonuniform temperature distributions up to 425F. All failures occurred in the required locations. (Author)
AD-653 872 HC$3.00 MF$0.65

FLIGHT EXPERIENCE WITH THE OGEE WING AT LOW SPEED.
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 1A.
AD-653 927 HC$3.00 MF$0.65

FLIGHT-MEASURED TURBULENCE IN THE NATO NATIONS.
Advisory Group for Aerospace Research and Development Paris (France)
Cyril G. Peckham. Feb 67, 57p Rept no. AGARD-555
NATO Furnished.

Descriptors: (*Turbulence, Flight), (*Aircraft, Design), Atmospheric motion, Gust loads, Airspeed, Altitude, Structural properties, Flight instruments.

As atmospheric turbulence environment is one of the primary problem areas in military aircraft structure design, all available data on turbulence were surveyed. The major portion of the data was collected with instruments that record airspeed, altitude, and acceleration at the center of gravity plus elapsed time from takeoff; although the instruments used in the various countries differ, the pertinent information is the same. The use of the discrete gust and the continuous turbulence concepts are discussed in relation to establishing the required spectra for both approaches. All data are reported by the individual countries: Canada, Germany, Italy, France, United Kingdom, and the United States. In addition to the turbulence data, flight loads, commercial survey loads, ground loads, sinking speeds, and runway profile data were also surveyed. (Author)
AD-654 037 HC$3.00 MF$0.65

AVION STABILITE VARIABLE (Variable Stability Aircraft),
Advisory Group for Aerospace Research and Development Paris (France)
G. Klopfstein. May 66, 31p Rept no. AGARD-537
NATO Furnished. Text in French; attached summary in English.

Descriptors: (*Aircraft, Stability), Design, France, Airframes, Simulation.
Identifiers: Mirage III B aircraft.

The report gives a general description of the first French variable stability aircraft. The aircraft was designed by the 'Centre d'Essais en Vol' and the 'Societe Francaise d'Equipements pour la Navigation Aerienne'. Modifications to the airframe of the basic production type Mirage III B were made by 'Avions Marcel Dassault'. The report also gives methods for calculating the gains and methods used to check the simulation. (Author)
AD-654 038 HC$3.00 MF$0.65

CALCULATED WEIGHT, BALANCE AND MOMENTS OF INERTIA.
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept
Jan 64, 139p Rept no. 139
Contract DA-44-177-TC-715
Rept. on XV-5A Light Fan Flight Research Aircraft Program.

Descriptors: (*Vertical take-off planes, Design), (*Research planes, Design), Weight, Stability, Moment of inertia, Lift, Propulsion, Fans, Tables.
Identifiers: V-5 aircraft.

The report contains weight and balance and aircraft moment of inertia data in summary and in detail. The summary data is given for several fuel, flight test instrumentation combinations considered compatible with the flight test program. Performance requirements were written for endurance missions of 20 and 45 minutes and therefore weights data are given for the aircraft with fuel to perform these missions with flight test instrumentation included. The design gross weight of the aircraft is 9200 lbs., and therefore data is given for this weight. Approximately 85 percent of the aircraft weight was obtained from measurement of component and sub-assembly weights. In addition, the aircraft itself was weighed and this actual weight has been used to derive various gross weight loading conditions. The Weight Empty given includes only those items required by the Aircraft Specification. It does not, for instance, include the auxiliary fuel tank nor instrumentation or other temporary items installed for initial flight test purposes. Horizontal distances used were measured from fuselage station zero. Vertical distances are measured from a theoretical plane 100 inches below the fuselage horizontal reference plane. (Author)
AD-654 041 HC$3.00 MF$0.65

CALCULATED WEIGHT, BALANCE AND MOMENTS OF INERTIA.
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept
Jan 64, 139p Rept no. 139
Contract DA-44-177-TC-715
Rept. on XV-5A Light Fan Flight Research Aircraft Program.

Descriptors: (*Vertical take-off planes, Design), (*Research planes, Design), Weight, Stability, Moment of inertia, Lift, Propulsion, Fans, Tables.
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AD-654 041 HC$3.00 MF$0.65

STRESS ANALYSIS MAIN LANDING GEAR.
General Electric Co Cincinnati Ohio Advanced Engine and Technology Dept

Jan 64, 231p Rept no. 142
Contract DA-44-177-TC-715
Rept. on XV-5A Light Fan Flight Research Aircraft Program.

Descriptors: (*Vertical take-off planes, Landing gear), (*Research planes, Landing gear), (*Landing gear, Stresses), Structural properties, Mathematical analysis, Loading (Mechanics), Lift, Fans, Propulsion.
Identifiers: V-5 aircraft.

The report consists of data substantiating the structural integrity of the main landing gear shock strut.
AD-654 042 MF$0.65

FULL SCALE WIND TUNNEL TEST REPORT.
General Electric Co Cincinnati Ohio Advanced Technology and Demonstrator Programs Dept
For primary bibliographic entry see Field 1A.
AD-654 043 HC$3.00 MF$0.65

DYNAGYRO: A MECHANICAL STABILITY AUGMENTATION SYSTEM FOR HELICOPTERS.
Technical rept.,
Dynasciences Corp Blue Bell Pa
M. George, E. Kisielowski, and A. A. Perlmutter.
Mar 67, 139p Rept no. DCR-221
USAAVLABS-TR-67-10
Contract DA-44-177-AMC-286 (T)

Descriptors: (*Helicopters, *Stabilization systems), Design, Performance (Engineering), Stability, Gyroscopes, Fuselages, Weight, Reliability, Tests.
Identifiers: DYNAGYRO.

The report presents the results of an investigation of the design and performance characteristics of a compact and lightweight stability augmentation system for helicopters. This system, known as the DYNAGYRO, consists of a two-degree-of-freedom coulomb damped gyroscope which is mounted within the helicopter fuselage. The investigation includes an analog computer study, a comprehensive component test program, and a bench test performance evaluation of a laboratory test model. The results obtained from the investigation showed that the DYNAGYRO provides stability augmentation characteristics which compare favorably with those of the much larger and heavier rotor hub-mounted devices. (Author)
AD-654 046 HC$3.00 MF$0.65

QUELQUES PROBLEMES DE QUALITES DE VOL POSES PAR LES AVIONS DE TRANSPORT A AILE ELANCEE SANS EMPENNAGE (Some Problems in Stability that Face Transport Aircraft having Slender Wings and no Tail-Unit),
Advisory Group for Aerospace Research and Development Paris (France)
P. LeComte, and E. Fage. May 66, 48p Rept no. GARD-532
Text in French; summary in English.

Descriptors: (*Aircraft, Stability), Wings, Tails (Aircraft), Design, Roll, Pitch (Motion), Standards, France.

A new generation of fairly large aircraft with slender wing and no tail-unit is about to be produced. These aircraft have a number of new features which differ both from those of delta wing fighter aircraft and from those of transport aircraft with moderately swept back wings. Some of these 'unusual' features are analysed from the point of view of the various tasks to be performed by the pilot and the applicability of certain standard or new criteria is examined. Possible characteristics of lateral stability are fairly widely explored and the complexity of the problem and the interaction between the various criteria are illustrated. When discussing longitudinal stability emphasis is placed on the particularly typical case of the behaviour of the aircraft at low speeds. The conclusion is drawn that for these aircraft the critical points are different from those of their predecessors and that the standards for assessing them must quite often be re-considered. Their stability and control characteristics as a whole, however, although different, compare favourably with those of preceding generations of aircraft. (Author)
AD-654 118 HC$3.00 MF$0.65

THE PROTECTION OF A AND A. E. E. WIRE AND OPTICAL TRACE ACCIDENT RECORDERS.
Aeroplane and Armament Experimental Establishment, Boscombe Down (England).
For primary bibliographic entry see Field 1B.
For abstract, see STAR 05 15.
N67-27791 HC$3.00 MF$0.65

FREE-FLIGHT MODEL MEASUREMENTS OF THE DYNAMIC STABILITY OF A SUPERSONIC STRIKE AIRCRAFT (TSR2).
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 15.
N67-27798 HC$3.00 MF$0.65

ON THE OPTIMIZATION OF THE POWER PLANT FOR A SHORT RANGE AIRCRAFT ITH SPECIAL REGARD TO HIGH BY-PASS RATIOS.
Vereinigte Flugtechnische Werke G.M.B.H., Bremen (West Germany).

For primary bibliographic entry see Field 21E.
For abstract, see STAR 05 15.
N67-27921 HC$3.00 MF$0.65

EVALUATION OF MILITARY AIR TRANSPORT SYSTEMS.
Bewertung Von Militaerischen Lufttransportsystemen
Industrieanlagen-betriebsgesellschaft M.B.H., Ottobrunn (West Germany). Operations Research Gruppe.
D. Fischer. 19 Aug 66, 37p ORG/MS-7
in German, English Summary Presented At the Ann. Joint Meeting grr/Wglr, Bad Godesberg, W. Germany, Oct. 1966

Descriptors: *Air transportation, *Military aircraft, *Transport aircraft, Air, Aircraft, Cargo, Conference, Cost, Estimate, Military, Transport, Transportation, V/stol.

For abstract, see STAR 05 15.
N67-27923 HC$3.00 MF$0.65

THE PERFORMANCE OF FANS IN HOVERCRAFT. A METHOD OF REDUCING EXPERIMENTAL RESULTS.
Royal Aircraft Establishment, Farnborough (England).
A. J. Burgess. Nov 65, 26p RAE-TR-65240

Descriptors: *Fan, *Hovering, Data, Edge, Flexible, Flow, Great britain, Jet, Lift, Model, Reduction, Rigid, Volume, Weight.

For abstract, see STAR 05 15.
N67-28071 HC$3.00 MF$0.65

A SEMIAUTOMATIC EQUIPMENT FOR THE CALIBRATION OF PRESSURE TRANSDUCERS.
Royal Aircraft Establishment, Farnborough (England).
P. C. Pole-baker. Nov 66, 24p RAE-TR-66352

Descriptors: *Calibration, Aircraft, Amplifier, Conditioning, Equipment, Error, Fluid, Gas, Gauge, Hydraulic, Missile, Nitrogen, Pneumatic, Pressure, Pressure transducer, Semiautomatic, Sensor, Signal, Test, Transducer.

For abstract, see STAR 05 15.
N67-28364 HC$3.00 MF$0.65

FEASIBILITY OF V/STOL CONCEPTS FOR SHORT-HAUL TRANSPORT AIRCRAFT.
Boeing Co., Morton, Pa.
B. L. Fry, and J. M. Zabinsky. May 67, 181p
NASA-CR-743
Contract NAS2-3142

Descriptors: *Transport aircraft, *V/stol aircraft, Aircraft, Configuration, Control, Cost, Design, Feasibility, Landing, Navigation, Noise, Operation, Short, Traffic, Transport, Turbofan, V/stol, Vtol.

For abstract, see STAR 05 15.
N67-28369 HC$3.00 MF$0.65

APPLICATION OF THE MODEL TECHNIQUE TO A VARIABLE-STABILITY HELICOPTER FOR SIMULATION OF VTOL HANDLING QUALITIES.
Advisory Group for Aerospace Research and Development, Paris (France).
For primary bibliographic entry see Field 1B.
For abstract, see STAR 05 15.
N67-28879 HC$3.00 MF$0.65

CALCULATION OF THE LOAD DISTRIBUTION, AT SUPERSONIC SPEEDS, ON A SWEPT-BACK WING OF ARBITRARY PLANFORM.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 15.
N67-28924 HC$3.00 MF$0.65

AIR CUSHION VEHICLE.
Final rept.,
Port of Oakland, Calif.
John L. Lambert. Apr 67, 80p CAL-MTD-3
Prepared in cooperation with Dept. of Housing and Urban Development. Rept. on Mass Transportation Demonstration Project.

Descriptors: (*Ground effect machines, *Transportation), (*Amphibious vehicles, Transportation), Passenger vehicles, Water traffic, Economics, Airports, Performance (Engineering), Urban areas, Tables, Velocity, Feasibility studies, Operation, Money, Time, Air, Design, Organizations, Maps, Weather, Costs, Maintenance, California.
Identifiers: Area Redevelopment.

The study reports on the suitability of the air cushion vehicle for use in public transportation. Air cushion vehicles were utilized for a one-year period in scheduled, passenger service between three terminals in the San Francisco Bay Area: Oakland International Airport, downtown San Francisco and San Francisco International Airport. Extensive operating and economic data was collected and a continuous passenger survey was undertaken for the desired evaluations. This is the final project report, and it describes the project background and organization, the procedures followed during the project, and the results and conclusions derived.
PB-174 849 HC$3.00 MF$0.65

ANALYSIS OF VSTOL AIRCRAFT CONFIGURATIONS FOR SHORT HAUL AIR TRANSPORTATION SYSTEMS.
Technical rept.,
Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
R. Gallant, M. Scully, and W. Lange. Nov 66, 182p FT-66-1
Contracts C-136-66, C-85-65

Descriptors: (*Aircraft, *Air transportation), Configuration, Turbofan engines, Air traffic, Costs, Analysis, Computer programs, Tilt wings, Jet engines, Fuselages, Rotary wings, Design, Performance (Engineering), Tables.
Identifiers: VSTOL.

The report has investigated the effects of further refinements to the computer programs as used for determining the vehicle characteristics and hence direct operating costs (DOC). Studies of the stowed rotor continue to show this aircraft to be a competitive configuration with DOCs of the same order as those of the helicopter at ranges above 50 miles. Unknown problems associated with stopping, retracting and stowing the rotor continue to make the prediction of the actual DOC of these vehicles difficult. The sensitivity of the results to these assumptions is discussed in the body of the report. An investigation of the effects of multiple hops, typical of a line haul type operation as compared to a shuttle type operation over a given stage length indicated that the average DOC was not appreciably affected by the multiple stop operation when compared with an aircraft operating over the same shorter distance.
PB-174 912 HC$3.00 MF$0.65

COMPUTERIZED SCHEDULE CONSTRUCTION FOR AN AIRLINE TRANSPORTATION SYSTEM.
Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
For primary bibliographic entry see Field 15E.
PB-174 913 HC$3.00 MF$0.65

MAINTENANCE COST STUDIES OF PRESENT AIRCRAFT SUBSYSTEMS.
Technical rept.,
Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
C. Pearlman, and Robert W. Simpson. Nov 66, 107p FT-66-2
Contracts C-136-66, C-85-65

Descriptors: (*Aircraft, *Maintenance), (*Aircraft equipment, *Costs), Jet transport planes, Automatic pilots, Aircraft fire control systems, Helicopters, Least squares method, Regression analysis, Air traffic, Tables, Aircraft engines.

The report describes two detailed studies of actual maintenance costs for present transport aircraft. The first part describes maintenance costs for jet transport aircraft broken down into subsystem costs according to an ATA classification. From 90 airlines polled, only four were able to supply costs in this breakdown. Despite the lack of data, multiple regression techniques were then used to demonstrate the construction of cost estimating formulae for both subsystems and a total aircraft system. The results indicate the possibility of improving present methods of estimating maintenance costs. (Author)
PB-174 914 HC$3.00 MF$0.65

WEATHER CONDITIONS AFFECTING VTOL AIRBUS OPERATIONS IN THE NORTHEAST CORRIDOR.
Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
For primary bibliographic entry see Field 4B.
PB-174 915 HC$3.00 MF$0.65

1D. AIRCRAFT FLIGHT CONTROL AND INSTRUMENTATION

FIBERCELL OVERHEAT HAZARD DETECTION SYSTEM.
Rept. for Jan 66-Jan 67,
Whittaker Corp San Diego Calif Narmco Research and Development Div
Stanley Yalof. Feb 67, 46p
AFAPL-TR-67-62
Contract AF 33 (615)-3530

Descriptors: (*Temperature sensitive elements, Electrolytic cells), (*Aviation safety, Sensors), Thermal batteries, Probes, Airborne, Ceramic materials, Lithium compounds, Boron compounds, Silicates, Heating, Warning systems, Fire alarm systems, Manufacturing methods, Materials, Performance (Engineering).
Identifiers: Fibercells, Overheat hazard detectors.

The purpose of the program was the development of an airborne overheat hazard detection system, utilizing the proprietary power-generating Fibercell concept as the sensor. Such a sensor was required to have a detection capability in the primary temperature range from 300F to 1000F, plus the capacity to withstand transient temperatures in excess of these limits. In general, Fibercell consists of a ceramic electrolyte electrochemical cell in the shape of a fiber, which is dependent on its temperature for electrical power output. Since the electrolyte resistivity is logarithmically related to temperature, the cell power output lessens rapidly with decreasing temperature. Below a particular temperature (determined by ceramic electrolyte composition) the cell is effectively disconnected from the alarm system -- a behavior that lends itself to long service life of the cell. To improve power output, reliability, and response time, various combinations of materials and construction methods were employed with resulting improvement in performance. With utilization of more energetic electrodes, and other means discussed in

the report, potentially greater efficiency can be achieved. (Author)
AD-653 996 HC$3.00 MF$0.65

QUELQUES PROBLEMES DE QUALITES DE VOL POSES PAR LES AVIONS DE TRANSPORT A AILE ELANCEE SANS EMPENNAGE (Some Problems in Stability that Face Transport Aircraft having Slender Wings and no Tail-Unit),
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 1C.
AD-654 118 HC$3.00 MF$0.65

1E. AIR FACILITIES

FOG DISPERSAL EXPERIMENTS USING PROPANE AT WALLA WALLA, WASHINGTON.
Technical rept.,
Cold Regions Research and Engineering Lab Hanover N H
J. R. Hicks. Apr 67, 18p Rept no. CRREL-TR-198

Descriptors: (*Fog, Washington (State)), (*Propanes, *Meteorological phenomena), Visibility, Artificial precipitation, Air traffic, Airports, Runways, Snow, Scattering, Costs, Freezing, Braking.

Propane is an effective agent causing glaciation of supercooled fog droplets and subsequent improvement of visibility. When wind is less than 5 or 6 knots and steady with respect to direction, two or three dispensers, each emitting 2.5 to 3 lb/min. of liquid propane, could probably keep an airfield open to air traffic at a cost of about 20 dollars per hour. The propane system is easy to use, inexpensive, requires neither preparation nor personnel standby time after the initial installation, and is effective at temperatures higher than the effective temperature of the more commonly used agents. No combustible mixture has been found beyond 8 ft from the discharge nozzle of the propane-air mixture. On airports with short runways, the reduced aircraft braking index caused by snow accumulation might be sufficient to render the system unsuitable unless the dispensers could be positioned far enough from the airport to allow the snow to fall upwind of the runway.
AD-653 636 HC$3.00 MF$0.65

JAMESTOWN VOR LOCALIZER (VORLOC).
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17G.
AD-653 719 HC$3.00 MF$0.65

COMPACTED-SNOW RUNWAYS IN ANTARCTICA - LIMITATIONS OF CONTAMINATED SNOW.
Technical rept.,
Naval Civil Engineering Lab Port Hueneme Calif
G. E. Sherwood, and E. H. Moser, Jr. Jun 67, 24p Rept no. NCEL-TR-533

Descriptors: (*Runways, *Snow), Contamination, Roads, Polar regions, Aircraft, Loading (Mechanics), Physical properties, Low-temperature research, Antarctic regions, Tests.

Techniques and equipment have been developed to utilize clean, undisturbed snow as a building material for emergency and temporary roads, runways, and skiways in polar regions. However, these routes are often needed in areas where the snow is contaminated. During Deep Freeze 65, a compacted-snow runway was constructed in an area of contaminated snow near McMurdo, Antarctica. The area had been contaminated by oil spillage, soot, and debris from previous operations. Physical property tests were conducted on the compacted snow near the end of Deep Freeze 65 and during Deep Freeze 66. It was concluded that contaminated snow can be processed to produce load-carrying material capable of supporting C-130 aircraft and other heavy loads at temperatures below 20F; however, because of the extra work involved to clear and process such snow, its marginal load-carrying capabilities at temperatures above 20F, and the possibility of low-strength areas, its use is not recommended where clean snow is available. New processing techniques resulted in improved quality control of compacted snow, and it was recommended that effort be continued to improve processing techniques. (Author)
AD-654 140 HC$3.00 MF$0.65

FOG DISPERSAL OVER AIRPORT RUNWAYS BY MEANS OF A MECHANICAL METHOD.
Deutsche Versuchsanstalt Fuer Luft- Und Raumfahrt, Troisdorf (West Germany).
For primary bibliographic entry see Field 4B.
For abstract, see STAR 05 15.
N67-28676 HC$3.00 MF$0.65

2. AGRICULTURE

2C. AGRICULTURAL ENGINEERING

SHORT COURSE ON HIGHWAY DEVELOPMENT (1st).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
For primary bibliographic entry see Field 13B.
PB-174 808 HC$3.00 MF$0.65

SHORT COURSE ON HIGHWAY DEVELOPMENT (3rd).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
For primary bibliographic entry see Field 13B.
PB-174 809 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (20th).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
For primary bibliographic entry see Field 13B.
PB-174 822 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (21st).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
For primary bibliographic entry see Field 13B.
PB-174 823 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (22nd).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
For primary bibliographic entry see Field 13B.
PB-174 824 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (25th).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
For primary bibliographic entry see Field 13B.
PB-174 826 HC$3.00 MF$0.65

2E. ANIMAL HUSBANDRY

THE DISTRIBUTION OF LEPTOSPIROSIS IN THE GERMAN SHEPHERD DOG POPULATION OF THE UNITED STATES,
Walter Reed Army Inst of Research Washington D C
Ralph E. Thomas. 1967, 4p
Availability: Published in Journal of the American Veterinary Medical Association v150 n1 p33-6 Jan 1 1967.

Descriptors: (*Dogs, Leptospira), (*Leptospira, Diseases), Serodiagnosis, Distribution, Agglutinins, Antigens + antibodies, United States, Veterinary medicine.

A serologic survey utilizing 7 leptospiral antigens was conducted on serums obtained from 1,161 German Shepherd Dogs originating in 46 states. Although conservative test criteria were employed, 12.4% reacted positively. Distribution of leptospiral titers in 144 seropositive dogs was as follows: canicola, 108 dogs (75%); icterohaemorrhagiae, 16 (11.1%); ballum, 8 (5.5%); autumnalis-pomona, 5 (3.5%); grippotyphosa, 4 (2.8%); and sejroe, grippotyphosa and pomona, grippotyphosa and autumnalis, 1 each (2.1%). The percentage of positive reactors by region ranged from 6.6 to 22.2%. The 2 regions with the highest percentage of positive reactors were in the southern semitropical belt of the United States. There was a stepwise increase in percentage positives by age from 9 months to 2 1/2 years. Sex differences in the distribution of serotypes were inconclusive. The frequency of occurrence of agglutinins to leptospiral organisms other than serotypes canicola and icterohaemorrhagiae strongly suggested the need for utilizing many test antigens when screening canine serums for leptospiral agglutinins. (Author)
AD-654 083 Not available from CFSTI.

2F. FORESTRY

IDENTIFICATION OF DESTRUCTIVE ALASKA FOREST INSECTS,
Pacific Northwest Forest and Range Experiment Station, Juneau, Alaska. Inst. of Northern Forestry.
For primary bibliographic entry see Field 6C.
PB-174 834 HC$3.00 MF$0.65

COMANDRA, GRAZING, AND COMANDRA BLISTER RUST.
Research paper,
Intermountain Forest and Range Experiment Station, Ogden, Utah.
W. A. Laycock, and R. G. Krebill. 1967, 15p
INT-36
Prepared in cooperation with Utah State Univ., Logan, Forestry Sciences Lab.

Descriptors: (*Plants (Botany), *Rusts (Microorganisms)), Animals, Food, Ecology, Trees, Grasses, Spores, Fungi, Diseases.
Identifiers: Grazing, Forage.

Comandra neither increases on nor invades most overgrazed ranges; thus there seems to be no relationship between grazing and outbreaks of comandra blister rust in lodgepole pine. (Author)
PB-174 847 HC$3.00 MF$0.65

PUBLICATIONS OF THE NORTHEASTERN FOREST EXPERIMENT STATION, 1950-1965.
Research paper,
Northeastern Forest Experiment Station, Upper Darby Pa.
Sylvia Horowitz, and Mary Buchanan. 1967, 136p
RP-NE-62

Descriptors: (*Forestry, Bibliographies), Indexes, Scientific research, Data, Classification, Subject indexing.

An alphabetical list, by authors, of 1,436 publications by staff members of the Northeastern Forest Experiment Station and their cooperators during the period 1950-1965. (Author)
PB-174 861 HC$3.00 MF$0.65

3. ASTRONOMY AND ASTROPHYSICS

3A. ASTRONOMY

ZUR ANWENDUNG DES SEQUENTIELLEN LICHTVERSTAERKERS IN DER ASTRONOMIE (The Use of Sequential Light Amplifiers in Astronomy),
Aerospace Research Labs Wright-Patterson AFB Ohio
Radames K. H. Gebel, Roy R. Hayslett, and Lloyd R. Wylie. 16 Nov 64, 10p Rept no. ARL-65-165
Text in Germain; attached summaries in English and French. Prepared in cooperation with Wittenberg Univ., Springfield, Ohio.
Availability: Published in Z. Instr. v73 n5 p130-7 1965.

Descriptors: (*Astronomy, *Optical equipment), (*Light, Amplifiers), Telescopes, Diffraction, Theory, Equations, Statistical analysis, Air, Exposure meters, Color photography, Velocity, Quantum mechanics, Photographic techniques, Astronomical data, Solar radiation, Sun, Mars (Planet), Earth (Planet), Cosmic rays, Aerial photographs.

The recording speed of a well built sequential light amplifier is determined by comparison with photographic films and found to be about 1,000,000 ASA. Therefore, for the next favorable opposition of Mars, exposure times of one milli-second become possible for pictures in color or in a narrow spectral region (delta wavelength = 100 A) when using a 200 inch telescope. The light amplifier permits contrast enhancement in the pictures and the short exposure times should yield sharper pictures, since the effect of changes in the diffraction of the air may, to a large extent, be avoided in this way. The total radiation of the sun in the spectral range of wavelength = 3000 to 7750 A has been calculated to be about 5.6 x 10 to the 44th power quanta per second, and that of extragalactic systems between 5 x 10 to the 50th power and 8 x 10 to the 55th power quanta per second. The distance range of extragalactic systems is calculated and plotted graphically as a function of the apparent magnitude with the absolute magnitude as parameter. It is calculated that the absolute theoretical limit of the sequential light amplifier as determined by quantum mechanics by using a 50 inch telescope outside the earth's atmosphere and one hour exposure time is about 32nd apparent magnitude. For an absolute magnitude of - 23 this would correspond to a distance of 4 x 10 to the 12th power light years when neglecting the effects of cosmic dust. A 28th apparent magnitude is considered as a possible theoretical value, which gives then a maximum distance of 50 x 10 to the 9th power light years. The theoretical distance calculated for the sequential light amplifier is therefore larger than the probable diameter of the universe usually assumed.
AD-653 400 Not available from CFSTI.

AN INTRODUCTION TO THE PROBLEM OF PHOTOGRAPHING ARTIFICIAL SATELLITES,
Wright Air Development Div Wright-Patterson AFB Ohio
Radames K. H. Gebel, Roy R. Hayslett, and Lloyd R. Wylie. 1962, 13p Rept no. WADD-TR-62-438
Prepared in cooperation with Wittenberg Univ., Springfield, Ohio.
Availability: Published in The Ohio Journal Science v62 n4 p191-202 Jul 1962.

Descriptors: (*Satellites (Artificial), Detection), (*Stars, Classification), (*Photographic techniques, Astronomical data), Brightness, History, Light, Telescopes, Photographic film, Efficiency, Photographic emulsions.

Some basic information useful for obtaining photographic recordings of celestial bodies, especially artificial satellites, is presented in this paper for the benefit of those who are not very familiar with astronomy. In the present space age this information may be quite helpful to those who are not trained in astronomy, but who are working in related fields. The historical origin of the magnitude system is discussed and basic equations are developed that will permit calculation of an approximate value of the exposure time necessary for different situations. This will give, for example, those who employ electronic detection methods a means of determining the order of photographic exposure time so that the speed made possible by electronic methods may be compared with the conventional photographic speed. (Author)
AD-653 405 Not available from CFSTI.

SOME EARLY TRIALS OF ASTRONOMICAL PHOTOGRAPHY BY TELEVISION METHODS,
Wright Air Development Div Wright-Patterson AFB Ohio
R. K. H. Gebel, and Lee Devol. 1958, 7p
Availability: Published in Symposium on Photo-Electronic Image Devices p195-201 Sep 1958.

Descriptors: (*Photographic techniques, *Astronomical cameras), (*Television cameras, Astronomical data), Sensitivity, Photosensitivity, Photographic contrast, Moon, Planets, Astronomical observatories, Resolution, Venus (Planet), Jupiter (Planet), Saturn (Planet).

This paper presents some astronomical photographs taken with optical amplifiers. The type of amplifier has attained the highest sensitivity to low light levels that was possible at the present time (1958).
AD-653 406 Not available from CFSTI.

ASTRONOMICAL OBSERVATIONS BY MEANS OF HIGHLY SENSITIVE ELECTRONIC LIGHT AMPLIFICATION,
Wright Air Development Div Wright-Patterson AFB Ohio
Radames K. H. Bebel, Lee Devol, and Lloyd R. Wylie. 1960, 15p Rept no. WADD-TR-60-189
Prepared in cooperation with Wittenberg Univ., Springfield, Ohio. Dept. of Astronomy.
Availability: Published in The Ohio Journal of Science v60 n6 p345-58 Nov 1960.

Descriptors: (*Closed circuit television, Astronomical data), (*Photographic techniques, *Astronomical cameras), Electronic equipment, Sensitivity, Photographic sensitivity, Moon, Venus (Planet), Jupiter (Planet), Saturn (Planet), Stars, Light, Cathode ray tubes.

The advantages of observing and photographing celestial bodies with a light amplifier that employs the closed circuit television principle are explored and treated here. Special pickup tubes were developed to insure optimum performance. The electrical signals from the pickup tube are electronically amplified and modified. The image is reproduced by a cathode ray tube and photographs may be obtained from the screen of this tube. The electronic amplification of the electrical signal permits light intensification of 10 to the 9th power times. The modification of the signal makes almost complete suppression of the background possible. It permits astronomical observations during the day and also at night that are not possible with systems in which the background cannot be suppressed. Photographs of celestial bodies taken at the Weaver Observatory of Wittenberg University are shown here. (Author)
AD-653 407 Not available from CFSTI.

THE LIMITATIONS FOR NIGHT-TIME DETECTION OF CELESTIAL BODIES EMPLOYING THE INTENSIFIER-STORAGE-IMAGE ORTHICON,
Wright Air Development Div Wright-Patterson AFB Ohio
Radames K. H. Gebel. 1961, 20p
Availability: Published in Ohio Journal of Science v61 n3 p129-47 May 1961.

Descriptors: (*Image orthicons, Astronomical cameras), (*Light, Detection), (*Satellites (Artificial), Detection), Closed circuit television, Mathematical analysis, Telescopes, Stars, Resolution, Night photography.

This paper calculates the results one may expect by using the image orthicon and intensifier image orthicon for detection of celestial bodies during night time hours. The paper treats, in Part I, the image orthicon without intensifiers and calculates the limit in detection determined by the scanning beam noise. In the Part II, the preamplification necessary for the intensifier section to overcome this scanning beam noise is calculated. The intensifier image orthicon is not necessarily the only arrangement for overcoming this beam noise. Intensifier image converter tubes effectively placed between the telescope and an image orthicon could produce the same results; however, such a solution is not suitable for use in flight vehicles because it results in a heavy bulky arrangement. (Author)
AD-653 416 Not available from CFSTI.

OBSERVATIONS OF TAURUS A AND THE QUASI-STELLAR SOURCE 3C 273 AT 1.53 CM.
Technical rept.,
California Univ Berkeley Space Sciences Lab
D. R. W. Williams, W. J. Welch, and D. D. hornton. 15 Mar 65, 8p Rept no. Series-8-Issue-35
Contracts Nonr-222 (54), Nonr-222 (66)
Availability: Published in Publications of the Astronomical Society of the Pacific v77 n456 p178-83 Jun 1965.

Descriptors: (*Radio astronomy, Astronomical data), Astronomical observatories, Antennas, Jupiter (Planet), Astrophysics.
Identifiers: Taurus-A, 3C 273.

During September 1964, the 85-foot antenna of the Hat Creek Observatory of the University of California was equipped with a 1.53-cm radiometer, principally for observing Mercury, Venus, Jupiter, and Saturn. During this time, measurements of a few other radio sources were made. This note presents the results of observations of Taurus A and the quasi-steller object 3C 273.
AD-653 437 Not available from CFSTI.

OBSERVATIONS OF JUPITER, SATURN, AND MERCURY AT 1.53 CENTIMETERS.
Technical rept.,
California Univ Berkeley Space Sciences Lab
W. J. Welch, D. D. Thornton, and R. Lohman. 13 May 66, 14p Rept no. Series-8-Issue-36
Contracts Nonr-222 (54), Nonr-222 (66)
Revision of manuscript submitted 12 May 65.
Availability: Published in Astrophysical Journal v146 n3 p799-809 Dec 1966.

Descriptors: (*Radio astronomy, Planets), Jupiter (Planet), Saturn (Planet), Mercury (Planet), Temperature, Antennas, Astronomical data, Moon, Microwaves, Ammonia, Clouds.

Observations of the radio emission from Jupiter, Saturn, and Mercury at 1.53-cm wavelength are reported. The disk temperature of Saturn was found to be 0.94 times that of Jupiter at this wavelength. Mercury, observed at an average phase angle of 125 degrees, was found to have a disk temperature three times that of Jupiter. With Jupiter's disk temperature assumed to be 150 degrees K at this wavelength, the temperatures of Saturn and Mercury are 141 degrees and 450 degrees K, respectively. The similarity in the emission from Jupiter and Saturn at this wavelength can be explained if one supposes that ammonia gas is the chief source of microwave thermal radiation from both

planets (due to the ammonia absorption band centered at 1.28 cm) and that the gas is saturated near the cloud tops of both planets. The possibility that emission from Saturn's rings may contribute to the radio 'disk' temperature of Saturn is briefly considered. The high disk temperature of Mercury at large phase angles is in agreement with the observations of Howard, Barrett, and Haddock at 3.75 cm and Kellermann at 11 cm.
AD-653 438 Not available from CFSTI.

A MEASUREMENT OF THE COSMIC MICROWAVE BACKGROUND TEMPERATURE AT 1.5 CM. WAVELENGTH.
Technical rept.,
California Univ Berkeley Space Sciences Lab
W. J. Welch, S. Keachie, D. D. Thornton, and G. Wrixon. 1967, 13p Rept no. Series-8-Issue-37
Contracts Nonr-222 (54), AF 19 (628)-5884

Descriptors: (*Space environmental conditions, Temperature), Antennas, Astrophysics, Galaxies, Astronomical data, Water vapor, Oxygen.

This report discusses the measurement of the cosmic microwave background temperature at 1.5 cm. wavelength; the result is 2.0 plus or minus 0.8 degrees K. Experimental techniques and the sources of error are mentioned.
AD-653 449 HC$3.00 MF$0.65

DISCUSSION OF PAPER BY M. E. RASSBACH, A. J. DESSLER, AND A. G. W. CAMERON, 'THE LUNAR PERIOD, THE SOLAR PERIOD AND Kp'.
Revised ed.,
Harvard Coll Observatory Cambridge Mass Solar Dept
Barbara Bell, and Richard J. Defouw. 28 Jul 66, 8p Rept no. Scientific-14
AFCRL-67-0202
Contract AF 19 (628)-3322
Revision of manuscript submitted 17 May 66. See also AD-648 833.
Availability: Published in Journal of Geophysical Research v71 n23 p5770-3 Dec 1 1966.

Descriptors: (*Terrestrial magnetism, Astronomy), (*Moon, Periodic variations), Magnetosphere, Interactions, Sun, Statistical analysis, Modulation, Solar systems, Phase shift, Sunspots.

Evidence from various workers for a variation in the level of geomagnetic activity with lunar phase is reviewed. Certain criticisms raised by Rassbach, et. al. are discussed.
AD-653 476 Not available from CFSTI.

STUDIES OF GALACTIC CLUSTERS AND GALACTIC PARAMETERS.
Final rept.,
California Univ Berkeley Radio Astronomy Lab
Harold Weaver. Nov 64, 137p
Contract AF 19 (604)-6170
Includes reprints.
Availability: Published in Various Journals.

Descriptors: (*Galaxies, *Astronomical data), Models (Simulations), Astronomy, Stars, Ellipsoids, Correlation techniques, Astronomical observatories, Sun, Hydrogen, Motion, Photometers, Gases, Velocity, Rotation, Theory, Equations of motion, Tables, Mathematical analysis.

The principal goals of the research were: To learn more about the larger environs of the sun primarily by investigation of the OB stars, classical cepheids, and galactic clusters. To investigate the field of motion of the galaxy on the basis of the motions of OB stars and cepheids. To derive a model of the galaxy, particularly investigating the question of galactic expansion, and so far as possible combining results from OB stars and cepheids with data from neutral hydrogen. As steps towards these goals, we here present a catalog of newly discovered star clusters, photoelectric observations of 64 northern cepheid variables, a study of several photometric systems on which cepheid variables have been observed, an investigation of the distances of galactic clusters, an investigation of the absolute magnitudes of early-type stars, a preliminary investigation of non-circular motions of the OB stars, an investigation of the similarity of distances of early-type stars and neutral hydrogen gas, investigation of the galactic rotation parameters derived from cepheid variables. (Author)
AD-654 002 Not available from CFSTI.

DETERMINATION OF THE RADIANTS, ALTITUDES AND VELOCITIES OF METEORS OBSERVED IN KIEV IN 1959.
Opredeleniye Radiantov, Vysot I Skorostey Meteorov Nablyudavshikhsya V Kiyeve V 1959 G.
Holman (John F.) and Co., Inc., Washington, D. C.
YU. N. Krivutsa, V. G. Kruchinenko, and L. M. Shulman. May 67, 9p NASA-TT-F-10968
Contract NASW-1495
Transl. Into English From Inform. Byul. Materialy Mezhdunarodnogo Geofizicheskogo Goda (USSR), No. 6, 1964 P 25-31

Descriptors: *Meteor, *Photograph interpretation, *Velocity measurement, Altitude, Circle, Coordinate, Cosine, Deceleration, Image, Interpretation, Least, Measurement, Method, Negative, Photographic, Polar, Reference, Scanning, Square, Star, Velocity.

For abstract, see STAR 05 15.
N67-28228 HC$3.00 MF$0.65

DETERMINATION OF THE MASSES AND DENSITIES OF METEORIC BODIES BY PHOTOGRAPHIC OBSERVATIONS.
Opredeleniye Mass I Plotnostey Meteornykh Tel Po Fotograficheskim Nablyudeniyam 1958- 1959 Gg.
Holman (John F.) and Co., Inc., Washington, D. C.
V. V. Benyukh, A. A. Demenko, and YE. V. Sandakova. May 67, 7p NASA-TT-F-10967
Contract NASW-1495
Transl. Into English From Inform. Byul. Materialy Mezhdunarodnogo Geofizicheskogo Goda (USSR), No. 6, 1964 P 20-24

Descriptors: *Density measurement, *Mass, *Meteor, *Photometry, Altitude, Atmospheric, Ballistics, Deceleration, Density, Dynamic, Equation, Flight, Fragmentation, Measurement, Observation, Particle, Table, Velocity.

For abstract, see STAR 05 15.
N67-28229 HC$3.00 MF$0.65

SYSTEMATIC CORRECTIONS TO REDUCE CERTAIN SATELLITE POSITIONS TO THE FK4 SYSTEM.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
K. Haramundanis. 14 Dec 66, 23p NASA-CR-84822, SAO SPECIAL REPT.-233
Grant NSG-87-60

Descriptors: *Astronomy, *Celestial observation, *Star tracking, *Stellar motion, Catalog, Celestial, Correction, Error, Motion, Observation, Position, Satellite, Star, Stellar, System, Table, Tracking.

For abstract, see STAR 05 15.
N67-28760 HC$3.00 MF$0.65

3B. ASTROPHYSICS

SUPPRESSION OF THE JEANS INSTABILITY IN COLLISIONLESS MEDIA.
Revised ed.,
Chicago Univ Ill
Edward P. Lee. 24 Oct 66, 7p
Contract Nonr-2121 (24)
Revision of manuscript received 5 Aug 66.
Availability: Published in Astrophysical Journal v148 p185-91 Apr 1967.

Descriptors: (*Galaxies, Stability), Statistical mechanics, Rotation, Gases, Perturbation theory, Integral equations.
Identifiers: Jeans instability, Liouville equation.

The behavior of plane-wave disturbances in an infinite rotating collisionless system is examined in the special case in which the wave vector is normal to the axis of rotation. It is shown that the system is stable with respect to such disturbances provided the rate of rotation exceeds a certain critical value. This result coincides with that known for a collision-dominated gas. (Author)
AD-653 420 Not available from CFSTI.

NEUTRAL OXYGEN IN LATE-TYPE STARS,
Palomar Observatory Pasadena Calif
Peter S. Conti, Jesse L. Greenstein, Hyron Spinrad, George Wallerstein, and M. S. Vardya. 7 Sep 66, 25p
AFOSR-67-1332
Contract AF 49 (638)-1323
Prepared in cooperation with Mount Palomar Observatory, Washington, California Univ., Berkeley, Washington Univ., and Utrecht Univ., (Netherlands).
Availability: Published in The Astrophysical Journal v148 p105-27 Apr 1967.

Descriptors: (*Oxygen, *Stars), Absorption, Carbon, Molecular properties, Solar atmosphere, Hydrogen, Equilibrium, Astrophysics, Velocity, Carbon dioxide, Nebulae, Nuclear properties, Iron, Helium, Spectroscopy, Nitrogen, Theory.

Forbidden absorption lines of neutral oxygen, originating in the ground state, have been observed in 70 G and K stars. Since oxygen is neutral there is little uncertainty in the interpretation of strength in terms of atomic oxygen abundance. The association of oxygen into CO, however, is important in cool stars. We find that most stars have the same oxygen/carbon ratio as the Sun. Stars with high-carbon abundance show weak oxygen lines, because of the CO formation. A surprising result is that old stars which are moderately deficient in metals have nearly the same oxygen content as the Sun. Apparently oxygen was synthesized more rapidly than the metals in our Galaxy soon after heavy elements began to be formed. (Author)
AD-653 424 Not available from CFSTI.

OBSERVATIONS OF TAURUS A AND THE QUASI-STELLAR SOURCE 3C 273 AT 1.53 CM.
California Univ Berkeley Space Sciences Lab
For primary bibliographic entry see Field 3A.
AD-653 437 Not available from CFSTI.

OBSERVATIONS OF JUPITER, SATURN, AND MERCURY AT 1.53 CENTIMETERS.
California Univ Berkeley Space Sciences Lab
For primary bibliographic entry see Field 3A.
AD-653 438 Not available from CFSTI.

UPPER LIMITS ON LIQUID WATER IN THE VENUS ATMOSPHERE.
Technical rept.,
California Univ Berkeley Space Sciences Lab
W. J. Welch, and D. C. Rea. 1967, 11p Rept no. Series-8-Issue-38
Contract Nonr-222 (54), Grant NSF-GA-527
Research supported in part by NASA, grant NsG-101-61.

Descriptors: (*Venus (Planet), Planetary atmospheres), (*Planetary atmospheres, *Water vapor), Atmosphere models, Quantitative analysis, Hy-

drochloric acid, Water, Dielectric properties, Hydrogen compounds, Fluorides.

The purpose of the report is to point out one consequence of the discovery of HCl and HF in the Venus atmosphere, namely, that on account of the presence of HCl there cannot be much liquid water in the atmosphere. HCl is highly soluble in water, and the resulting acid has a high DC conductivity. If there were much of this acid in the Venus atmosphere, the long wavelength radar signals would be strongly attenuated, whereas the radar signals appear to reach the planet's surface with little attenuation. (Author)
AD-653 452 HC$3.00 MF$0.65

CLASSIFICATION OF SOLAR PROMINENCES FOR SUNSPOT CYCLE NO. 19 (1955-1964) - SUMMARY.
Harvard Coll Observatory Cambridge Mass Solar Dept
Donald H. Menzel, and F. Shirley Jones. Mar 67, 49p Rept no. Scientific-13
AFCRL-67-0209
Contract AF 19(628)-3322

Descriptors: (*Solar disturbances, Astronomical data), Solar corona, Sunspots, Astrophysics, Reviews.
Identifiers: Solar prominences.

The areas and behavior classifications of the prominences on the sun during Solar Cycle No. 19 are summarized, and a study is presented of the distribution of the various classes with solar latitude. During this solar cycle, 90 per cent of the prominences were of A types in which the material descended from the corona, and 16 per cent were of S types, associated with sunspots. The biggest class of prominences was the ANd or hedgerow type; the smallest, the ASl's of loop prominences. The overall trend in prominence areas was thus due mainly to the ANd prominences. North-south asymmetries of the areas reveal that for all classes of prominences together there was a northern excess except for the year 1961. (Author)
AD-653 573 HC$3.00 MF$0.65

MINERALOGICAL AND PETROGRAPHIC STUDIES OF SIMULATED LUNAR MATERIAL,
Army Engineer Research and Development Labs Fort Belvoir Va
O. Fred Kezer. May 67, 21p Rept no. AERDL-1899

Descriptors: (*Lunar environment, Simulation), (*Surface properties, Moon), Basalt, Physical properties, Chemical properties, Igneous rock, Aging (materials), Solar flares.

The report is the final report on an in-house research study dealing with the effects of a simulated lunar environment on inorganic terrestrial materials. (Author)
AD-653 618 HC$3.00 MF$0.65

ACCELERATION ON A GALACTIC SCALE,
Stanford Univ Calif Inst for Plasma Research
P. A. Sturrock. May 67, 37p Rept no. SUIPR-157
Contract AF 49(638)-1321, Grant NsG-703
Presented at the Texas Symposium on Relativistic Astrophysics (1967), New York, 23-27 Jan 67. Research supported in part by ONR, Contract N00014-67-A-0112-006.

Descriptors: (*Plasma medium, Stability), (*Radio astronomy, Particle accelerator techniques), Astrophysics, Magnetic fields, Gravity, Acceleration, Galaxies, Particle beams.
Identifiers: ^{3}C273, Quasars.

Observations of radio galaxies and of radio emission from quasars provide evidence for particle acceleration on a galactic scale. The acceleration is typically associated with some kind of explosion, i.e., with an instability. It appears, therefore, that galactic acceleration is part of a spontaneous process occurring in a closed system of galactic dimensions. An analogous process on a laboratory scale is provided by certain plasma experiments, in which a quiescent plasma exhibits a sudden 'explosive' instability which in turn leads to acceleration of some particles to high energies. This comparison leads to the suggestion that a galactic explosion which leads to particle acceleration is typically a plasma instability. Various forms are suggested for the magnetic-field configuration to be associated with a newly condensed object with the mass of a galactic nucleus, tentatively identified as a quasar, and an evolved radio galaxy. The energy content of such configurations is estimated, and shown to be adequate to explain observed radio clouds. Discussion of a radio outburst of 3C 273 leads to the view that some of the radio emission from quasars is the result of collective plasma processes. Hence such outbursts provide direct evidence for the occurrence of plasma instabilities on a galactic scale.
AD-653 650 HC$3.00 MF$0.65

ELECTRON COLLISIONS WITH IONS OF THE 3P (3) CONFIGURATION,
Aerospace Research Labs Wright-Patterson AFB Ohio
S. J. Czyzak, and T. K. Kreuger. 21 Sep 66, 9p Rept no. ARL-67-0083
Availability: Published in Journal Proc. Phys. Soc. v90 p623-7 1967.

Descriptors: (*Nebulae, Line spectrum), (*Atomic energy levels, Excitation), (*Electron bombardment, Ions), Interactions, Probability, Hartree-Fock approximation, Wave functions, Electron transitions.

Extensive calculations are being made of the cross sections for electron impact excitation of the metastable levels of the 3p (q) (q = 2, 3, 4) configuration. These cross sections are important in the interpretation of gaseous nebulae spectra. Collision strengths are reported for ions in the 3p (3) isoelectronic sequence. The calculations are made using an improved distorted wave method recently formulated by Seaton. (Author)
AD-653 661 Not available from CFSTI.

ARE YOUNG GALAXIES VISIBLE.
Revised ed.,
Princeton Univ N J Palmer Physical Lab
R. B. Partridge, and P. J. E. Peebles. 8 Sep 66, 22p
Contract Nonr-1858 (30)
Revision of manuscript submitted 5 Aug 66.
Availability: Published in The Astrophysical Journal v147 n3 p868-86 Mar 1967.

Descriptors: (*Galaxies, *Visibility), Night sky, Hydrogen, Luminescence, Astronomical data, Mathematical analysis, Astrophysics, Stability.

The purpose of this paper is to assess the general possibility of observing distant, newly formed galaxies. To this end a simple model of galaxy formation is introduced. According to the model galaxies should go through a phase of high luminosity in early stages of their evolution. The estimated luminosity for a galaxy resembling our own is approximately equals 3 x 10 to the 46th power ergs/sec, roughly 700 times higher than the present luminosity. The bright phase would occur at an epoch of about 1.5 x 10 to the 8th power years, corresponding to a redshift between 10 and 30, depending on the cosmological model assumed. The possibility of detecting individual young galaxies against the background of the night sky is discussed. Although the young galaxies would be numerous and would have sufficiently large angular diameters to be easily resolved, most of the radiation from the young galaxies would arrive at wavelengths of 1-3 micron where detection is difficult. However, it seems possible that the Lyman-a line might be detected if it is a strong feature of the spectra of young galaxies. It is also shown how such an experiment might help us to distinguish between various cosmological models. (Author)
AD-653 677 Not available from CFSTI.

THE GRAVITATIONAL INSTABILITY OF THE UNIVERSE,
Princeton Univ N J Palmer Physical Lab
P. J. E. Peebles. 8 Aug 66, 7p
Contract Nonr-1858 (30)
Availability: Published in The Astrophysical Journal v147 n3 p859-63 Mar 1967.

Descriptors: (*Astrophysics, *Gravity), Galaxies, Astronomical data, Motion, Stability, Theory, Mathematical analysis, Time.

It is argued that the expanding universe is unstable against the growth of gravitational perturbations. The argument is directed toward two problems, the physical conditions in the early, highly contracted phase of the expanding universe, and the formation of the galaxies. (Author)
AD-653 678 Not available from CFSTI.

INTERPLANETARY SECTOR STRUCTURE, 1962-1966.
Technical rept.,
California Univ Berkeley Space Sciences Lab
Norman F. Ness, and John M. Wilcox. 4 May 67, 23p Rept no. Series-8-Issue-40
Contract Nonr-3656 (26)

Descriptors: (*Magnetic fields, Space environmental conditions), (*Scientific satellites, Magnetic fields), Solar wind, Sunspots, Magnetosphere, Space probes.

Some properties of the interplanetary magnetic field observed by IMP-3 in the latter half of 1965 are discussed with relation to previous satellite observations of the interplanetary field. The sector property remains a prominent feature of the observations, with the average field direction at the Archimedes spiral angle. The sector pattern has a 27-day recurrence period from 1962 to 1964, and during the year 1964 the pattern appears to be quasi-stable. In 1965 the recurrence period is about 28 days, and the evolution of the pattern is more rapid, with new sectors appearing and expanding. (Author)
AD-653 747 HC$3.00 MF$0.65

THE PRIMEVAL FIREBALL.
Technical rept.,
Princeton Univ N J Dept of Physics
P. J. E. Peebles, and D. T. Wilkinson. Jun 67, 14p
Contract Nonr-1858 (30)
Original contains color, reproducible in black/white only after original supply is exhausted.
Availability: Published in Scientific American v216 n6 p28-37 Jun 1967.

Descriptors: (*Extraterrestrial radio waves, Sources), Theory, Electromagnetic waves, Distribution, Blackbody radiation, Radio astronomy, Radiometers, Scanning, Cyanogen, Emissivity, Interstellar matter, Helium, Galaxies.
Identifiers: Big-bang theory, Cosmic evolution, Primeval fireball evolution.

One of the implications inherent in the 'big bang' cosmology is that a 'primeval fireball' of radiation, surviving from the earliest days of the universe, should isotropically fill cosmic space. A semitechnical discussion is given of the theoretical basis for the prediction of this primeval fireball radiation and of the problems necessarily involved in its detection. The modified Dicke radiometers which were used by the Princeton group in the search for and study of this radiation are described; and the discovery of the radiation (at 7.35 mm, initially), the verification of its source, and the ascertain-

ment of its isotropy is all recounted. Consideration is also given to the confrontation between theory and experiment with regard to the connection between the temperature of the primeval fireball and the amount of helium in the matter that came out of the big bang and condensed into galaxies.
AD-653 756 Not available from CFSTI.

THE INVARIANT IMBEDDING EQUATIONS FOR THE DISSIPATION FUNCTIONS OF AN INHOMOGENEOUS FINITE SLAB WITH ANISOTROPIC SCATTERING,
Rand Corp Santa Monica Calif
For pr mary bibliographic entry see Field 20M.
AD-653 923 HC$3.00 MF$0.65

ON THE SOLAR DIFFERENTIAL ROTATION AND MERIDIONAL CURRENTS,
Aerospace Corp El Segundo Calif Labs Div
William J. Cocke. Apr 67, 28p Rept no. TR-1001 (2260-01)-2
SSD-67-83
Contract AF 04 (695)-1001

Descriptors: (*Sun, Rotation), (*Fluid dynamic properties, Sun), Viscosity, Hydrodynamics, Equations of motion, Convection (Heat transfer), Turbulence, Mathematical analysis.

The solar differential rotation and large-scale meridional currents are investigated with the axially symmetric, time-independent hydrodynamic equations of motion, including anisotropic convective viscosity forces. The phi-component of the equations of motion is integrated to give a linear, ordinary differential equation determining the angular velocity distribution. The Reynolds number for the differential rotation in the convection zone is shown to be large, and an approximation based on this fact is used to solve the equations of motion to first order, under the assumption that the polar heating effects are negligible and that the convection zone is barytropic. A good fit to the observed differential rotation is obtained if the anisotropy parameter satisfies s - 1 approximately equals 1/5; the differential rotation is then approximately independent of the magnitude of the dynamic convective viscosity eta. The circulational velocities near the surface at high latitudes are approximately (s - 1) (1/rho) grad eta. Reasonable agreement with observed values is shown. (Author)
AD-653 987 HC$3.00 MF$0.65

STUDY OF SOLAR WIND INTERACTIONS.
Final rept., 1 Jan 64-31 Dec 66,
Rice Univ Houston Tex Dept of Space Science
A. J. Dessler. 31 Dec 66, 143p
AFCRL-67-0267
Contract AF 19 (628)-3858
Includes reprints.
Availability: Published in Various Journals.

Descriptors: (*Solar wind, Interactions), (*Magnetosphere, Solar wind), Aurorae, Cosmic rays, Lunar environment, Magnetic fields, Terrestrial magnetism, Diurnal variations, Plasma medium.

The report is divided into two parts: Part I - Solar Wind Phenomena, and Part II - Magnetospheric Phenomena. The papers in Part I contain discussions of phenomena in which the solar wind itself is involved in a primary way. The papers grouped into Part II cover phenomena in which the solar wind acts through its effect on the magnetosphere. (Author)
AD-654 007 Not available from CFSTI.

RADIATIVE TRANSFER. I. THE FLUX-TEMPERATURE RELATION AND NON-GRAY STELLAR ATMOSPHERES.
Revised ed.,
California Univ Berkeley Dept of Astronomy
Louis Henyey. 31 Oct 66, 12p
AFOSR-67-1348
Grant AF-AFOSR-171-65
Revision of manuscript received 15 Aug 66.
Availability: Published in Astrophysical Journal v148 p207-16 Apr 1967.

Descriptors: (*Stars, Atmosphere models), Astrophysics, Temperature, Heat transfer, Mathematical analysis, Absorption, Scattering, Thermal radiation.

The problem of non-gray model atmospheres is reviewed. An improved iterative procedure is considered which is based on the rigorous solution of Milne's second integral equation for the Planck function in terms of the flux. Applying the solution at each wavelength with allowance for both absorption and scattering, and using the assumption that Fv/F does not vary between iterations to any great extent, a temperature correction method is proposed. The approximate evaluation of certain new functions is considered. (Author)
AD-654 021 Not available from CFSTI.

ON THE EFFECT OF INTERSTELLAR MATERIAL ON STELLAR NON-CIRCULAR VELOCITIES IN DISK GALAXIES.
Revised ed.,
Chicago Univ Ill Dept of Mathematics
William H. Julian. 25 Oct 66, 14p
AROD-2160:19
Grant DA-ARO (D)-31-124-G592
Revision of manuscript submitted 29 Aug 66.
Availability: Published in The Astrophysical Journal v148 p175-84 Apr 1967.

Descriptors: (*Galaxies, *Interstellar matter), Momentum, Gravity, Stars, Velocity, Astrophysics, Mathematical analysis, Mathematical models, Theses.

The paper re-examines the question of the secular increase of stellar non-circular velocities in the disk portions of the Galaxy and similar systems. The possible gravitational disturbances from interstellar gas inhomogeneities on spiral structure scales are discussed with the inclusion of forces from accompanying standing waves of star density. Attention is restricted to the disk portion of a galaxy, where a 'local' and 'thin disk' model is used. Based on this model, the process is shown to derive the required energy from the differential rotation and gravitation of the star disk. It is estimated numerically to produce important increases in the mean stellar velocity dispersions during galactic lifetimes under reasonable assumptions regarding the amount and distribution of the interstellar material. (Author)
AD-654 093 Not available from CFSTI.

NUCLEAR ENERGY LEVELS OF 37K,
California Inst of Tech Pasadena
For primary bibliographic entry see Field 20H.
AD-654 156 HC$3.00 MF$0.65

UPPER LIMITS ON LIQUID WATER IN THE VENUS ATMOSPHERE.
California Univ., Berkeley.
D. G. Rea, and W. J. Welch. 1966, 9p NASA-CR-84601
Contract NASR-220, Grant NSG-101-61

Descriptors: *Hydrogen chloride, *Venus atmosphere, *Water, Absorption, Acid, Atmosphere, Chloride, Cloud, Emission, Fluoride, Hydrogen, Limit, Liquid, Microwave, Spectrum, Surface, Upper, Vapor, Venus.

For abstract, see STAR 05 15.
N67-28001 HC$3.00 MF$0.65

AN UPPER LIMIT ON THE QUIET TIME SOLAR NEUTRON FLUX AT ENERGIES GREATER THAN 60 ME V.
Minnesota Univ., Minneapolis. School of Physics and Astronomy.
J. F. Ormes, and W. R. Webber. Jan 67, 16p
NASA-CR-84665, CR-93
Grant NSG-281

Descriptors: *Balloon flight, *Cerenkov counter, *Neutron flux, *Scintillation counter, *Solar flux, Balloon, Charge, Cosmic, Counter, Differential, Earth, Energy, Flight, Flux, High energy, Neutron, Nucleus, Proton, Quiet, Ray, Scintillation, Secondary, Solar, Spectrum, Telescope, Time.

For abstract, see STAR 05 15.
N67-28020 HC$3.00 MF$0.65

VIABILITY OF MICROORGANISMS IN THE DESERT SOILS OF TURKMENIA.
Scientific Translation Service, La Canada, Calif.
For primary bibliographic entry see Field 6M.
For abstract, see STAR 05 15.
N67-28222 HC$3.00 MF$0.65

WHAT DOES ZODIACAL LIGHT CONSIST OF (QUES).
en Quoi Consiste La Lumiere Zodiacale (ques)
Holman (John F.) and Co., Inc., Washington, D.C.
J. C. Houzeau. Jun 67, 5p NASA-TT-F-11034
Contract NASW-1495
Transl. Into English From Ciel Terre, V. 1, 1880/1881 P 517-521

Descriptors: *Comet, *Gegenschein, *Zodiacal light, Corpuscle, Earth, Light, Nucleus, Path, Polarization, Radius, Ratio, Relation, Solid, Spectrum, Sun, Tail, Vector, Zodiac.

For abstract, see STAR 05 15.
N67-28224 HC$3.00 MF$0.65

INVESTIGATION OF PLANETARY IONOSPHERES.
Cutler-hammer, Inc., Deer Park, N. Y.
S. H. Gross, G. Kraft, D. Lugansk , B. Mohr, and Z. Poznanski. May 67, 205p NASA-CR-689
Contract NAS5-9108

Descriptors: *Ionospheric sounding, *Planetary atmosphere, Atmosphere, Circuit, Instrumentation, Ionospheric, Mariner program, Mars, Planetary, Processor, Propagation, Radar, Radio, Resolution, Signal, Sounding, Transmitter, Voyager project.

For abstract, see STAR 05 15.
N67-28368 HC$3.00 MF$0.65

STUDIES OF EXTRATERRESTRIAL DUST AT 40 KILOMETERS (1966) FINAL REPORT.
Litton Systems, Inc., Minneapolis, Minn. Applied Science Div.
For primary bibliographic entry see Field 22A.
For abstract, see STAR 05 15.
N67-28774 HC$3.00 MF$0.65

POSSIBLE INTERPRETATION OF THE RESULTS OF MEASUREMENTS ON THE NEAR-LUNAR SATELLITE "AMS LUNA-10".
Volt Technical Corp., Washington, D. C.
For primary bibliographic entry see Field 22A.
For abstract, see STAR 05 15.
N67-28875 HC$3.00 MF$0.65

THE CHEMICAL COMPOSITION OF NORMAL STELLAR ATMOSPHERES.
California Univ., Los Angeles.
L. H. Aller. 1966, 5p NASA-CR-84882
Contract NGR-05-007-046

Descriptors: *Chemical composition, *Spectroscopy, *Stellar atmosphere, Analysis, Atmosphere,

Chemical, Composition, Line, Method, Model, Profile, Quality, Spectrum, Stellar.

For abstract, see STAR 05 15.
N67-28928 HC$3.00 MF$0.65

3C. CELESTIAL MECHANICS

INVESTIGATION OF THE PROPER MOTIONS OF STELLAR CLUSTER XII - NGC 2422, NGC 2423, NGC 7209 AND AN. BARKHATOVA I IN SEL. AREA 40.
Untersuchungen Ueber Die Eigenbewegungen Von Sternhaufen Xii Ngc 2422, Ngc 2423, Ngc 7209 Und An. Barkhatova I Im Sel. Area 40
Bonn Univ. (West Germany). Astronomical Inst.
H. Van Schewick. 1966, 46p REPT.-74
in German, English Summary

Descriptors: *Planetary motion, *Star cluster, Cluster, Epoch, Galaxy, Giant, Motion, Photometry, Planetary, Plate, Star.

For abstract, see STAR 05 15.
N67-27815 HC$3.00 MF$0.65

PHYSICAL LIBRATION OF A DEFORMABLE MOON THEORY I SEMIANNUAL PROGRESS REPORT, AUG. 29, 1966 - FEB. 28, 1967.
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
C. L. Goudas, and Z. Kopal. 28 Feb 67, 37p
NASA-CR-84662, SAPR-1
Contract NASW-1470

Descriptors: *Librational motion, *Lunar gravitation, Body, Distribution, Earth, Ellipticity, Field, Libration, Lunar, Mass, Moon, Motion, Perturbation, Physical, Solid.

For abstract, see STAR 05 15.
N67-28016 HC$3.00 MF$0.65

THE INTERRELATION OF SMALL BODIES OF THE SOLAR SYSTEM.
K Voprosu O Vzaimosvyazi Malykh Tel Solnechnov Sistemy
Holman (John F.) and Co., Inc., Washington, D.C.
A. K. Terentyeva. May 67, 7p NASA-TT-F-10965
Contract NASW-1495
Transl. Into English From Inform. Byul. Materialy Mezhdunarodanogo Geofizicheskogo Goda (USSR), No. 6, 1964 P 11-15

Descriptors: *Asteroid, *Comet, *Jacobi integral, *Meteorite, *Solar system, *Three-body problem, Approximation, Attraction, Body, Circular, Constant, Distribution, Equation, First, Gravitational, Inertia, Interrelationship, Magnitude, Motion, Orbit, Particle, Problem, Small, Solar, System, Three.

For abstract, see STAR 05 15.
N67-28225 HC$3.00 MF$0.65

4. ATMOSPHERIC SCIENCES

4A. ATMOSPHERIC PHYSICS

ON THE QUESTION OF CALCULATIONS OF THERMAL RADIATION OF THE ATMOSPHERE,
Foreign Technology Div Wright-Patterson AFB Ohio
Khelgi Niilisk. 28 Mar 67, 46p Rept no. FTD-MT-65-569
TT-63-10937
K Voprosu o Raschetakh Teplovogo Izlucheniya Atmosfery, edited machine trans. of Issledovaniya po Fizike Atmosfery (Estonian SSR) v2 p67-114 1960.

Descriptors: (*Troposphere, *Thermal radiation), Graphics, Atmosphere, Mathematical models, Atmospheric temperature, USSR.

A study of radiation monographs based on different principles would enable clarifying the cause of divergent results and attempting the evaluation of the advantages and disadvantages of individual monographs. By using aeroclimatic data for various global zones, an attempt is made to obtain average typical data about the movement of thermal radiation fluxes at different latitudes and heights in the troposphere.
AD-653 511 HC$3.00 MF$0.65

THE ROLE OF METASTABLE, NEUTRAL ELECTRONICALLY EXCITED SPECIES IN ATMOSPHERIC DEIONIZATION.
Technical information series,
General Electric Co Philadelphia Pa Missile and Space Div
R. H. Kummler, and M. H. Bortner. May 67, 92p Rept no. 67SD20

Descriptors: (*Atmosphere, *Recombination reactions), (*Oxygen, Excitation), (*Nitrogen, Excitation), Atomic energy levels, Molecular energy levels, Neutralization, Dissociation, Reaction kinetics, Atmosphere entry, Airburst.

The importance of metastable neutral electronically excited species to deionization in the post burst period is considered. Energy levels, lifetimes, production sources, reactions and depletion sinks for excited states of the important atmospheric constituents, N2, O2, O and N are discussed, and extant data on each is tabulated along with some data on minor species. Hypotheses drawn from examination of these tables are tested in an expanded Keneshea Code for numerical integration of the deionization equations. As a res lt of these calculations, it appears as though the deexcitation detachment reaction of O2 ((1)delta-g) with O2 (-) is the most important detachment process at altitudes below 70 km, if its rate constant is of the same order as that for associative detachment reactions. (Author)
AD-653 516 HC$3.00 MF$0.65

DEVELOPMENTS IN METEOROLOGICAL SENSORS AND MEASURING techniques to 150,000 FEET, 1966.
Thornthwaite (C W) Associates Elmer N J Lab of Climatology
For primary bibliographic entry see Field 4B.
AD-653 622 HC$3.00 MF$0.65

AN IDEALIZED PROBLEM WITH F2-LAYER APPLICATIONS,
Queen Mary Coll London (England)
W. M. Pickering. 1967, 27p Rept no. Scientific-8
AFCRL-67-0174
Grant AF-EOAR-74-64

Descriptors: (*Atmosphere models, *Ionosphere), (*Atmospheric motion, Ionosphere), Diffusion, Ions, Electrons, Plasma medium, Magnetic fields, Mathematical analysis.

An idealized problem is solved which illustrates the coupling between neutral air motion and the transport of plasma in a model F2 layer. The magnetic field lines are assumed to be horizontal and the effects of both vertically upwards and vertically downwards Hall drifts are considered. Very slow circulating motion of the neutral air is assumed to take place in a vertical plane parallel to the magnetic field lines. This motion is assumed to be coupled with the diffusive and Hall motions of the plasma. It is shown that if only the production and loss functions for electrons are known a non-linear diffusion equation is produced. (Author)
AD-653 648 HC$3.00 MF$0.65

NO-O CHEMILUMINESCENCE STUDIES: FLIGHT AND WIND TUNNEL EXPERIMENTS.
Final rept., 18 Jan 66-17 Jan 67,
Mithras Inc Cambridge Mass
R. Earl Good. Jan 67, 7 p Rept no. MC-65-197-R2
AFCRL-67-019
Contract AF 19 (628)-5825

Descriptors: (*Nitrogen oxides, Upper atmosphere), (*Oxygen, Upper atmosphere), (*Upper atmosphere, Simulation), Atmospheric sounding, Wind tunnels, Chemiluminescence, Supersonic flow, Flight.
Identifiers: Chemical-release studies.

Upper atmosphere releases of nitric oxide trails were simulated in a wind-tunnel. The nitric oxide was released from a model into the low density tunnel flow of partially dissociated air. The radiant power produced was measured by photographic and photoelectric techniques. The tests were conducted at Mach numbers 1.99 and 3.27 and at stagnation pressures between 25 and 200 microns Hg, with known NO and O flow rates. Flight experiments were performed in June 1966. The design of the experiments was based on the wind-tunnel studies. A preliminary analysis of the flight data is given, based on the wind-tunnel studies. (Author)
AD-653 649 HC$3.00 MF$0.65

OBSERVATIONS OF LARGE-SCALE COHERENT PULSATING ELECTRON PRECIPITATION EVENTS IN THE AURORAL ZONE, ACCOMPANIED BY GEOMAGNETIC CONTINUOUS PULSATIONS,
Bergen Univ (Norway) Dept of Physics
S. L. Ullaland, H. Trefall, G. Kremser, and A. Bewersdorff. 28 Sep 66, 19p
AFOSR-67-1314
Contract AF 61 (052)-869
Prepared in cooperation with Max-Planck-Institut fuer Aeronomie, Lindau/Harz (West Germany), and Laboratoire de Physique Cosmique, Meudon (France).
Availability: Published in Journal of Atmospheric and Terrestrial Physics v29 p395-410 1967.

Descriptors: (*Electron bombardment, Aurorae), Norway, Sweden, Balloons, Bremsstrahlung, X rays, Solar wind, Magnetosphere, Terrestrial magnetism, Measurement.

Through balloon observations of X-ray bremsstrahlung in the auroral zone pulsating electron precipitation events have been found that are coherent over areas of at least several hundred kilometers in both the N-S and E-W directions. During one such event, which was observed simultaneously from three widely separated balloons in 1964, the X-ray intensity peaks were found to be simultaneous within the accuracy of measurement, which was one second or less. The X-ray pulsations had periods between 65 and 100 sec, and lasted for more than two hours around local noon. This noon-time pulsating electron precipitation arose nearly out of the cosmic-ray background, and did not seem to be caused by modulation of a continuously existing electron flux. It was accompanied by geomagnetic continuous pulsations, but these did not always show the same period as the X-ray variations. There are indications that the pulsating electron flux and the accompanying MHD-wave were related, and that both phenomena may have been generated in the same process through interaction of the solar wind with the sunward side of the magnetosphere. Two probably similar events were observed in 1965, also around local noon. (Author)
AD-653 698 Not available from CFSTI.

CORRELATION BETWEEN OPTICAL AND RADIO EMISSION FROM EXTENSIVE AIR SHOWERS AT LARGE ZENITH ANGLES,
University Coll Dublin (Ireland)
B. McBreen, E. P. O'Mongain, N. A. Porter, and P. J. Slevin. 11 Nov 66, 3p
AFOSR-67-1324
Grant AF-EOAR-80-63
Availability: Published in Physics Letters v23 n11 p677-8 Dec 12 1966.

Descriptors: (*Cosmic ray bursts, Detection), Radio signals, Optical phenomena, Antennas, Optical equipment, Magnetic fields, Radio interference, Electrical equipment, Cerenkov radiation.

Evidence has been found for correlation between optical and radio emission from extensive air showers at large zenith angles, using a Cerenkov optical detector and wide-band radio system. Results indicate a probable enhancement of the radio emission mechanism for showers developing at high altitudes. This is consistent with, but does not conclusively demonstrate, an interaction with the earth's magnetic field. (Author)
AD-653 702 Not available from CFSTI.

ATMOSPHERIC OZONE INVESTIGATIONS AT BARROW, ALASKA, DURING 1965,
Washington Univ Seattle Dept of Atmospheric Sciences
John J. Kelly, Jr. Jun 67, 102p Rept no. Scientific-9
Contract Nonr-477 (24)

Descriptors: (*Ozone, Measurement), (*Arctic regions, Ozone), Diurnal variations, Alaska, Experimental design, Computer programs.

The results of the measurements of ozone in air at Barrow, Alaska, are presented. The theory of operation of the microcoulomb analyzer, and the methods of calculations and calibrations are discussed. The average daily and hourly concentrations of ozone in the atmosphere near the ground surface are tabulated for the year 1965. The results of the analysis of ozone measured continuously from light aircraft along several transects in northern Alaska are given. (Author)
AD-653 745 HC$3.00 MF$0.65

INTERPLANETARY SECTOR STRUCTURE, 1962-1966.
California Univ Berkeley Space Sciences Lab
For primary bibliographic entry see Field 3B.
AD-653 747 HC$3.00 MF$0.65

HIGH ALTITUDE ROCKET PLUME STRUCTURE.
General Dynamics/Convair San Diego Calif
For primary bibliographic entry see Field 20D.
AD-653 769 HC$3.00 MF$0.65

MANUAL FOR ARN-3 TYPE ATMOSPHERIC NOISE MEASURING EQUIPMENT,
Stanford Research Inst Menlo Park Calif
R. L. Brown. Nov 66, 153p Rept no. SRI-Special TR-27
Contract DA-36-039-AMC-00040 (E), ARPA Order-371

Descriptors: (*Noise, *Atmosphere), Instruction manuals, Electronic equipment, Design, Very low frequency, Bandwidth, Calibration, Operation, Maintenance, Voltage, Maps, High frequency, Low frequency, Circuits, Medium frequency, Antennas, Data processing systems, Measurement.

Equipment has been developed and constructed for use in studies of atmospheric noise in Thailand. Average noise power and the mean envelope voltage can be measured at eight frequencies in the VLF, LF, MF, and HF bands. The design of this equipment is derived from the National Bureau of Standards (now ESSA) ARN-2 noise-measuring equipment. The equipment is operated in conjunction with the standard ARN monopole and ground plane and so the data obtained are compatible with data from the existing worldwide network of noise stations coordinated by ESSA, Boulder, Colorado. Impulsive voltages induced in the standard antenna by local thunderstorms are recorded at several threshold levels by lightning-flash analyzer equipment to supplement the ARN type data. This report is intended as an operation and maintenance manual. It explains the principles of operation and includes schematic diagrams and sample records as well as a description of calibration and data-reduction procedures. (Author)
AD-653 780 HC$3.00 MF$0.65

MEASUREMENTS OF RADIATIVE FLUX DIVERGENCE IN THE ARCTIC.
Technical rept.,
Washington Univ Seattle Dept of Atmospheric Sciences
R. J. Lieske, and L. A. Stroschein. 3 Jan 66, 16p Rept no. TR-25, Contrib-124
Contract Nonr-477 (24)
Availability: Published in Archiv fuer Meteorologie, Geophysik und Bioklimatologie v15 n1/2 p67-81 1967.

Descriptors: (*Thermal radiation, *Arctic regions), Measurement, Fog, Atmospheric temperature, Stratus clouds, Alaska, Heat transfer, Humidity, Radiometers.

Radiative divergence in the atmosphere was measured during 1964 at Point Barrow, Alaska, at a location 2.5 km inland from the Arctic Ocean. C.S.I.R.O.-radiometers were used in the two observational techniques employed: (1) A radiometer was mounted on the vertically traveling boom of a specially designed tower, measurements being taken at 1, 2, 3, 4 and 5 m, and (2) A gimbalized radiometer was suspended from a moored 'kytoon', measurements being taken at levels up to 250 m. Tower data comprise approximately 80 hours of observations over snow-covered tundra, in the temperature range of -4 to -30 degrees C. Kytoon data comprise observations of six flights of 2 to 3 hours duration, all but one being over grassy tundra, in the temperature of of -5 to 5 degrees C. The sign of the measured divergence was usually negative, and the maximum convergences occurred during clear, calm weather, and in the lowest layers. The absolute magnitude of calculated divergences was consistently less than that of the measured values. More accurate temperature and humidity measurements are necessary to explain the poor agreement of calculated and measured radiative divergences. (Author)
AD-653 808 Not available from CFSTI.

ON CHEMILUMINESCENT RADIATION FROM NITROGEN DIOXIDE DURING PCA EVENTS,
California Univ Berkeley Dept of Physics
Robert R. Brown. 2 Aug 66, 6p
AFOSR-67-1379
Grant AF-AFOSR-331-65
Availability: Published in Journal of Atmospheric and Terrestrial Physics v29 p317-20 1967.

Descriptors: (*Nitrogen oxides, *Chemiluminescence), (*Upper atmosphere, Chemiluminescence), Ozone, Solar disturbances, Polar regions, Emissivity, Band spectrum, Aurorae, Photochemistry.

The chemiluminescent radiation from the interaction of nitric oxide and atmospheric ozone was evaluated for PCA conditions. The integrated emission rate obtained is small in comparison with radiation from the nightglow. (Author)
AD-653 811 Not available from CFSTI.

CONVECTIVE ELEMENTS.
Final rept.,
Washington Univ Seattle Dept of Atmospheric Sciences
K. H. Bergman, J. A. Businger, M. Miyake, and J. A. Turner. Apr 67, 80p
ECOM-039G1-F
Grant DA-AMC-36-039-63-G-1

Descriptors: (*Convection (Atmospheric), Heat transfer), (*Atmosphere models, Fluid flow), Stability, Tornadoes, Anemometers, Meteorological instruments, Heat flux, Vortices, Atmospheric temperature, Mathematical analysis.

Contents: Design of a simple heat flux meter; On the direct determination of the vertical heat flux; Some characteristics of concentrated convective vortices; Investigation of a particular mode of instability for an idealized vortex model.
AD-653 849 HC$3.00 MF$0.65

THE INVARIANT IMBEDDING EQUATIONS FOR THE DISSIPATION FUNCTIONS OF AN INHOMOGENEOUS FINITE SLAB WITH ANISOTROPIC SCATTERING,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 20M.
AD-653 923 HC$3.00 MF$0.65

CONVECTION IN A BOX: LINEAR THEORY,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 20D.
AD-653 924 HC$3.00 MF$0.65

ON THE HEAT EFFECT OF THE 15-MICRON BAND OF CARBON DIOXIDE IN THE UPPER ATMOSPHERE,
Rand Corp Santa Monica Calif
G. M. Shved. May 67, 14p Rept no. P-3596

Descriptors: (*Carbon dioxide, Upper atmosphere), (*Thermal radiation, *Mesosphere), Heat transfer, Stratosphere, Mathematical analysis, Atmosphere models, Infrared radiation, Atmospheric temperature.

The heating effect of the 15 micron band of CO2 in the mesosphere is estimated based on the approximation of the isolated line. The Voigt line profile and temperature dependence of line intensities are taken into account, but vibrational relaxation is not. The latter affects the magnitude but not the sign of the heating rates above about 75 km. The principal result is that although the 15 micron band cools most of the mesosphere, it produces a warming effect in much of the region above 70 km.
AD-653 931 HC$3.00 MF$0.65

METHOD OF COMPUTING THE DEVIATION FROM KIRCHOFF'S LAW IN THE MESOSPHERE FOR THE TRANSFER OF RADIATION IN THE 15-MICRON BAND OF CARBON DIOXIDE,
Rand Corp Santa Monica Calif
G. M. Shved. May 67, 24p Rept no. P-3597

Descriptors: (*Carbon dioxide, Mesosphere), (*Thermal radiation, Upper atmosphere), Atmosphere models, Absorption spectrum, Relaxation time, Water vapor, Infrared radiation, Heat transfer, Mathematical analysis, Thermodynamics, Stratosphere.

The ideal structure of the absorption band, as used by Curtis and Goody in the calculation of the radiative heating due to the 15 micron CO2 band, may result in large errors. Accurate calculations require a knowledge of the real structure of the band as well as the replacement of the usual relaxation equation by the system of gas-kinetic equations. The probabilities of nonelastic collisions, taking into account Fermi resonance, are computed. The vibrational relaxation time of CO2 in dry air at 200 degrees K and 1 atm pressure is expected to fall

within the interval 2--20 x 10 to the -6th power sec. The contribution of water vapor to the relaxation time of CO2 is discussed. (Author)
AD-653 933 HC$3.00 MF$0.65

APPROXIMATION OF THE SINGLE LINE DURING THE TRANSFER OF RADIANT ENERGY IN THE UPPER ATMOSPHERE,
Rand Corp Santa Monica Calif
G. M. Shved. May 67, 7p Rept no. P-3595

Descriptors: (*Carbon dioxide, Upper atmosphere), (*Thermal radiation, Upper atmosphere), Infrared radiation, Stratosphere, Mathematical analysis, Absorption spectrum, Atmosphere models, Mesosphere, Heat transfer.

The author considers values of the frequency interval about the line center in which the approximation of the isolated line is valid for radiative transfer in the mesosphere and upper stratosphere. The regions of validity for this approximation are estimated in the case of the 15 micron CO2 band.
AD-653 935 HC$3.00 MF$0.65

IONOSPHERIC RESEARCH USING SATELLITES.
Summary rept. no. 1, 17 Nov 65-17 Nov 66
University Coll Nairobi (Kenya) Dept of Physics
Arthur N. Hunter, and Alan R. Webster. 21 Nov 66, 44p
AFCRL-67-0284
Contract AF 61 (052)-909

Descriptors: (*Ionosphere, Satellites (Artificial)), (*Scientific research, Ionosphere), Electrons, Scintillation, Geometry, Errors, Magneto-optic effect, Time, Measurement, Tables, Magnetic fields, Recording systems, Density, Sunspots.

Results are presented for total content at Nairobi since October 1964, and for Addis Ababa and Dar es Salaam since June 1966. Latitude variation of total content is being studied using three spaced receiving stations on similar longitudes; preliminary results are presented for the period July/August 1966. Study of irregularities has been commenced using scintillations of transmissions from B.E.-B and B.E.-C and the heights of these irregularities will be determined from transmissions from B.E.-B using spaced aerials. One of us (A.R.Webster) has made a study of geometric errors in Faraday reduction. Other work includes the determination of ionospheric parameters by means of an Ionosonde, investigations on the shape, size and speed of irregularities, by a spaced aerial technique, and recording of the variations of the earth's magnetic field. Future plans include continuation of the above work, development of automatic Faraday null reading equipment and possibly the addition of one or two other stations for the study of the latitude variation of scintillations and total content. (Author)
AD-653 950 HC$3.00 MF$0.65

IONOSPHERIC RESEARCHES USING SATELLITES.
Progress rept. no. 13, 1 Jan 65-31 Mar 67
Paris Univ (France) Laboratoire de Physique de l'Atmosphere
Etienne J. Vassy. 15 Apr 67, 49p
AFCRL-67-0337
Contract AF 61 (052)-761
See also AD-642 840.

Descriptors: (*Ionosphere, Atmospheric sounding), (*Satellites (Artificial), *Atmospheric sounding), Mesosphere, Radio signals, Electrooptics, Electron density, Absorption.
Identifiers: Explorer.

Contents: Analysis of a programmed Faraday total-electron at two near frequencies; Errors in total electron content using the differential Faraday method; The interest of total electron content measurements for the geophysicist; Statistical account of the development of the total electron content in terms of various parameters; Study on refraction by computation of the differential Doppler and Faraday effects at 20 and 40 Mc/s; Test-rig for digital measurement of Faraday-zeo time intervals; Experimental device for the measurement of the Differential Doppler Fizeau effect of the artificial satellites; Experimental methods of ionospheric absorption measurements by means of artificial earth satellites.
AD-653 983 HC$3.00 MF$0.65

ROCKET INSTRUMENTATION FOR AURORAL MEASUREMENTS - BLACK BRANT AC 17.604,
Utah Univ Salt Lake City Upper Air Research Labs
D. A. Burt. Mar 67, 65p Rept no. Scientific-7, UU67-1
AFCRL-67-0295
Contract AF 19 (628)-4995

Descriptors: (*Aurorae, Atmospheric sounding), (*Sounding rockets, Instrumentation), Ionospheric disturbances, Electrons, Ions, Sensors, Conductivity, X rays.

The report details the instrumentation developed by the University of Utah for a Black Brant rocket designed to make multiple D-region measurements during an auroral absorption event. This rocket was launched from the Churchill Research Range in 1966, by Air Force Cambridge Research Laboratories. The instruments on the rocket were designed to measure the following: Electron density; Electron temperature; Plasma conductivity; Ion density; Energy deposition electron > 5 kev, proton > 60 kev; Lyman-alpha radiation; Auroral light, 3914 A; Auroral light wideband (4000-12,000 A); Vehicle potential; Bremsstrahlung X rays (1-8 A). (Author)
AD-653 992 HC$3.00 MF$0.65

SPECTROSCOPIC RESEARCH.
Chicago Univ Ill
For primary bibliographic entry see Field 7D.
AD-654 005 HC$3.00 MF$0.65

STUDY OF SOLAR WIND INTERACTIONS.
Rice Univ Houston Tex Dept of Space Science
For primary bibliographic entry see Field 3B.
AD-654 007 Not available from CFSTI.

A TECHNIQUE FOR SOLVING THE GENERAL REACTION-RATE EQUATIONS IN THE ATMOSPHERE.
Environmental research papers no. 263,
Air Force Cambridge Research Labs L G Hanscom Field Mass
Thomas J. Keneshea. Apr 67, 148p Rept no. AFCRL-67-0221

Descriptors: (*Reaction kinetics, Computer programs), (*Atmosphere, Reaction kinetics), (*Ionosphere, Reaction kinetics), Nonlinear differential equations, Numerical analysis, Photochemistry, Gas ionization, Electrons, Oxygen, Nitrogen oxides, Nitrogen, Ozone, Chemical reactions, Recombination reactions, Diurnal variations.

With the availability of numerical techniques for solving an extensive set of nonlinear differential equations and high-speed computers for performing the calculations, interest in solving the unrestricted reaction-rate equations is growing among ionospheric researchers. In view of this a refinement is given of the techniques previously developed in PB-163 071 and AD-424 173. The computer code is written to solve the photochemical behavior of 15 atmospheric species; these species are electrons, O (-), O2 (-), O3 (-), NO2 (-), O (+), O2 (+), N2 (+), NO (+), NO, N, NO2, O3, N2O, and O. Built into the code are 168 reactions that can conceivably take place among these constituents. Several examples of the results obtained using the code are presented, including the buildup of ionization from zero concentrations at altitudes in the D and E regions and the deionization of an atmosphere with high initial electron densities. The diurnal variation of the atmospheric constituents is also presented along with profiles for the above-mentioned species from 60 km to 120 km. The computer codes are included in their entirety with complete explanations on their usage. (Author)
AD-654 010 HC$3.00 MF$0.65

SURVEY OF IONOSPHERIC IRREGULARITIES OVER EUROPE,
Advisory Group for Aerospace Research and Development Paris (France)
O. Bratteng, and J. Frihagen. 1966, 41p Rept no. AGARD-554
NATO Furnished.

Descriptors: (*Ionospheric disturbances, *Radio signals), (*Scientific satellites, Radio signals), Computer programs, Europe, Scintillation, Attenuation, Refractive index, Diffraction.

The height of the ionospheric irregularities giving rise to satellite scintillation has been found using spaced receiver observations from several places in Europe and on Spitsbergen. The irregularities are found to be in the 200-400 km range over Europe. Only two observations from Spitsbergen were reducible and gave heights above 400 km. (Author)
AD-654 036 HC$3.00 MF$0.65

THERMAL RADIATION PHENOMENA. VOLUME I. THE EQUILIBRIUM THERMODYNAMIC PROPERTIES OF HIGH TEMPERATURE AIR,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 20M.
AD-654 054 HC$3.00 MF$0.65

THERMAL RADIATION PHENOMENA. VOLUME II. THE EQUILIBRIUM RADIATIVE PROPERTIES OF AIR - THEORY,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 20M.
AD-654 055 HC$3.00 MF$0.65

HARP 5-INCH AND 16-INCH GUNS AT YUMA PROVING GROUND, ARIZONA.
Memorandum rept.,
Ballistic Research Labs Aberdeen Proving Ground Md
C. H. Murphy, and G. V. Bull. Feb 67, 50p Rept no. BRL-MR-1825

Descriptors: (*Wind, *Atmospheric sounding), (*Guns, Atmospheric sounding), Sabot projectiles, Arizona, Telemeter systems, Launching, Upper atmosphere.
Identifiers: HARP project.

The 5- and 16-inch guns at Yuma Proving Ground and their associated instrumentation and flight results for 1966 are described in detail. The introduction of multi-point ignition for the 16-inch gun produced a record altitude of 111 miles using special propellants and the moderate altitude of 77 miles with surplus Naval propellant. Twenty-four ionospheric wind profiles have been obtained from 16-inch gun firings and 15 stratospheric profiles from the 5-inch firings. Telemetry performance and ground recovery capability have been demonstrated. (Author)
AD-654 123 HC$3.00 MF$0.65

DESIGN CRITERIA FOR A HIGH SPEED TEST FACILITY WITH ARC HEATER AND MHD-ACCELERATOR FOR SIMULATION OF ATMOSPHERIC ENTRY.
Industrieanlagen-betriebsgesellschaft M.B.H., Ottobrunn (West Germany).
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 15.
N67-27806 HC$3.00 MF$0.65

METEOROLOGICAL RESEARCHES, NO. 11.
Academy of Sciences (USSR), Moscow. Soviet Geophysical Committee.
1966, 177p REPT.-11
in Russian, English Summaries

Descriptors: *Antarctica, *Atmospheric composition, *International geophysical year (igy), *Meteorological flight, *Northern hemisphere, *Ocean, *Southern hemisphere, *U.S.S.R., Actinometry, Anomaly, Atmosphere, Circulation, Composition, Field, Flight, Geology, Geophysics, Hemisphere, International, Land, Meteorology, North, Pressure, South, Temperature, Turbulence, Wind, Year.

For abstract, see STAR 05 15.
N67-27856 HC$3.00 MF$0.65

AURORA AND AIRGLOW - ARTICLES, NO. 13.
Academy of Sciences (USSR), Moscow. Soviet Geophysical Committee.
1967, 134p
in Russian, English Summaries

Descriptors: *Airglow, *Auroral emission, *Emission spectrum, Activity, Analysis, Atmosphere, Aurora, Distribution, Disturbance, Emission, Energy, Geomagnetic, Helium, High latitude, Hydrogen, Hydroxyl, Night, Oxygen, Sky, Solar, Spectrum, Statistical, Twilight, Upper.

For abstract, see STAR 05 15.
N67-27881 HC$3.00 MF$0.65

THEORY OF ELECTRIC FIELD MEASUREMENTS CONDUCTED IN THE MAGNETOSPHERE WITH ELECTRIC PROBES.
Royal Inst. of Tech., Stockholm (Sweden).
U. Fahleson. May 66, 48p ESRO-SN-28
Presented At the Esro Colloq. on Auroral and Assoc. Magnetospheric Phenomena At Very High Latitudes, Stockholm, 16-18 Nov. 1965

Descriptors: *Conference, *Electric field, *Magnetosphere, *Plasma probe, Anisotropy, Capacitance, Capacitor, Debye function, Density, Electric, Electrode, Electron, Error, Field, Flux, Gradient, Ionosphere, Measurement, Noise, Particle, Photoelectron, Photoemissivity, Plasma, Probe, Proton, Sheath, Strength, Temperature, Thermal.

For abstract, see STAR 05 15.
N67-27924 HC$3.00 MF$0.65

FRONTAL IONIZATION PHENOMENA DURING THE ELDO SLV FLIGHT.
Selenia S. P. A., Rome (Italy).
For primary bibliographic entry see Field 9F.
For abstract, see STAR 05 15.
N67-27925 HC$3.00 MF$0.65

E L D O- A VEHICLE - FRONTAL IONIZATION EFFECTS ON THE RADIATION OF THE THIRD STAGE TELEMETRY ANTENNAS.
Selenia S. P. A., Rome (Italy).
For primary bibliographic entry see Field 9F.
For abstract, see STAR 05 15.
N67-27926 HC$3.00 MF$0.65

RECENT PROGRESS IN THE STUDY OF V.L.F. AND E.L.F. WAVES.
Progres Recents Dans l'Etude des Ondes T.B.F. Et E.B.F.
Groupe de Recherches Ionospheriques, Issy-les-moulineaux (France).
R. Gendrin. Oct 66, 137p ESRO-SN-31
in French, English Summary Presented At the Esro Colloq. on Auroral and Assoc. Magnetospheric Phenomena At Very High Latitudes, Stockholm, 16-18 Nov. 1965

Descriptors: *Extremely low frequency (elf), *Ionic wave, *Magnetohydrodynamic wave, *Resonance effect, *Very low frequency, *Whistler, Density, Effect, Electron, Frequency, Interaction, Ionic, Lifetime, Magnetohydrodynamic, Particle, Plasma, Propagation, Resonance, Theory, Transmitter, Transverse, Trapping, Very low, Wave.

For abstract, see STAR 05 15.
N67-27930 HC$3.00 MF$0.65

COUPLING BETWEEN THE OUTER MAGNETOSPHERE AND THE HIGH-LATITUDE IONOSPHERE.
Royal Inst. of Tech., Stockholm (Sweden).
L. P. Block. May 66, 28p ESRO-SN-26
Presented At the Esro Colloq. on Auroral and Assoc. Magnetospheric Phenomena At Very High Latitude, Stockholm, 16-18 Nov. 1965

Descriptors: *Coupling, *Ionosphere, *Magnetosphere, Angle, Conference, Density, Distribution, Electric, Electron, Electrostatic, Emission, Field, Geomagnetic, High latitude, Instability, Ion, Parallel, Particle, Pitch, Plasma, Precipitation, Radiation, Splash, Topology, Trap, Wave.

For abstract, see STAR 05 15.
N67-27937 HC$3.00 MF$0.65

INVESTIGATION OF THE AERONOMY UP TO 50000 KM.
Incursion Aeronomique Jusqu'a 50000 Km
Institut D Aeronomie Spatiale de Belgique, Brussels.
G. Kockarts. 1967, 33p
in French, English Summary Presented At the Soc. Belg. D'astr. de Meteorol. Et de Phys. Du Globe Terrest., 17 Dec. 1967 Submitted for Publication Its Aeronomica Acta A-52-1967

Descriptors: *Aeronomy, *Atmospheric composition, *Energy spectrum, *Upper atmosphere, Activity, Atmosphere, Atmospheric, Composition, Conference, Density, Energy, Exosphere, Heterosphere, Homosphere, Interaction, Particle, Pressure, Solar, Spectrum, Structure, Temperature, Upper.

For abstract, see STAR 05 15.
N67-27939 HC$3.00 MF$0.65

OBSERVATIONS OF THE SEPTEMBER 2, 1966 PCA EVENT - MIDDAY RECOVERY IN ABSORPTION.
California Univ., Berkeley. Cosmic Ray Group.
R. R. Brown, and R. Parthasarathy. 1966, 21p
NASA-CR-84369
Contracts NAS5-3595, NSF GP-5506

Descriptors: *Balloon, *Polar cap absorption, *Riometer, Absorption, Cap, Cosmic, Counter, Flux, High energy, Ionosphere, Particle, Polar, Ray, Recovery, Scintillation, Solar, Spectrum.

For abstract, see STAR 05 15.
N67-28002 HC$3.00 MF$0.65

ANNUAL VARIATIONS OF COSMIC RAYS AND INTENSITY VARIATIONS OF COSMIC RADIATION AS A FUNCTION OF EARTH'S HELIOLATITUDE.
Godovyye Variatsii Kosmicheskikh Luchey I Izmeneniye Intensivnosti Kosmicheskoy Radiatsii V Funktsii Gelioshiroty Zemli
Volt Technical Corp., Washington, D. C.
L. I. Dorman, A. A. Luzov, and V. P. Mamrukova. 27 Mar 67, 6p NASA-CR-84672, ST-CR-10582
Contract NAS5-12487
Transl. Into English From Dokl. Akad Nauk Sssr, Ser. Geofiz. (Moscow), V. 172, No. 4, 1967 P 833-836

Descriptors: *Annual variation, *Cosmic ray, *Radiation intensity, Atmosphere, Cosmic, Earth, Intensity, Radiation, Ray, Sun, Temperature, Variation.

For abstract, see STAR 05 15.
N67-28007 HC$3.00 MF$0.65

STUDIES OF THE EQUATORIAL IONOSPHERE USING TRANSMISSIONS FROM ACTIVE SATELLITES ANNUAL SUMMARY REPORT, 1 FEB. 1964 - 31 JAN. 1966.
Ghana Univ., Legon. Dept. of Physics.
I. Katsrikv, J. R. Koster, and M. Tete. 1 Aug 67, 100p AFCRL-66-814, ASR-1
Contract AF 61/052/-800

Descriptors: *Early bird satellite, *Ionosphere, Attenuation, Beacon, Communication, Computer, Correlation, Density, Drift, Electron, Ground, Program, Refraction, Scintillation, Tracking, Transmission, Velocity.

For abstract, see STAR 05 15.
N67-28634 HC$3.00 MF$0.65

KINEMATICS OF LEE-WAVES-FLOW.
Kinematik Der Leewellenstroemung
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Munich (West Germany). Institut Fuer Physik Der Atmosphaere.
W. Georgii. Mar 67, 39p DLR-FB-67-20, DVL-613
in German, English Summary

Descr ptors: *Kinematics, *Lee wave, Amplitude, Current, Disturbance, Energy, Equilibrium, Flow, Geostrophic, Layer, Lee, Reflection, Resonance, Stratosphere, Troposphere, Wave.

For abstract, see STAR 05 15.
N67-28669 HC$3.00 MF$0.65

THE PROBLEM OF USING MARINER IV IONOSPHERIC DENSITIES TO DEDUCE A MODEL OF THE MARTIAN ATMOSPHERIC STRUCTURE.
Pittsburgh Univ., Pa. Dept. of Physics.
T. M. Donahue. 7 Apr 67, 24p NASA-CR-84825, SRCC-41
Contract NASR-179
Presented At the Conf. on the Atmospheres of Mars and Venus, Kitt Peak Natl. Lab., Feb. 1967

Descriptors: *Atmosphere model, *Ionospheric electron density, *Mariner iv space probe, *Mars atmosphere, Atmosphere, Carbon dioxide, Density, Electron, F- 1 layer, Ion, Ionization, Ionospheric, Measurement, Model, Planetary, Probe, Profile, Space, Structure, Temperature.

For abstract, see STAR 05 15.
N67-28785 HC$3.00 MF$0.65

COMPARISON OF AIR DENSITIES OBTAINED FROM ORBITAL DECAY AND INSTRUMENTS.
Royal Aircraft Establishment, Farnborough (England).
G. E. Cook. Nov 66, 25p RAE-TR-66370
Presented At the Roy. Soc. Meeting on Orbital Anal., London, 17-18 Oct. 1966

Descriptors: *Atmospheric density, *Drag, *Orbit decay, *Pressure gauge, *Upper atmosphere, Ab-

sorption, Air, Atmosphere, Atmospheric, Calibration, Coefficient, Comparison, Conference, Decay, Density, Gauge, Mass, Orbit, Orbital, Period, Pressure, Probe, Radiation, Satellite, Solar, Spectrometer, Thermosphere, Upper, X-ray.

For abstract, see STAR 05 15.
N67-28925 HC$3.00 MF$0.65

LABORATORY AND THEORETICAL INVESTIGATION OF CHEMICAL RELEASE EXPERIMENT FINAL REPORT, 8 OCT. 1965 - 10 NOV. 1966.
Geophysics Corp. of America, Bedford, Mass. Gca Technology Div.
H. K. Brown, J. P. Padur, J. Pressman, A. Sharma, and P. Warneck. Feb 67, 23p NASA-CR-84871, GCA-TR-67-4-N
Contract NASW-1341

Descriptors: *Atmospheric chemistry, *Chemiluminescence, *Upper atmosphere, Atmosphere, Atmospheric, Atom, Chemical, Chemistry, Cloud, Compound, Experiment, Intensity, Measurement, Nitrogen, Organometallic, Oxygen, Ozone, Reaction, Release, Spectrophotometry, Temperature, Transition, Upper, Vibration.

For abstract, see STAR 05 15.
N67-28934 HC$3.00 MF$0.65

THE NONDIPOLE PART OF THE GEOMAGNETIC FIELD IS MANIFEST AT MAGNETOSPHERE BOUNDARY.
Nedipol'naya Chast' Geomagnitnogo Polya Skazyvayetsya Na Granitse Magnitosfery
Volt Technical Corp., Washington, D. C.
YU. D.Kalinin. 22 May 67, 4p NASA-CR-84877, ST-GM-PF-10610
Contract NAS5-12487
Transl. Into English From Geomagnetizm I Aeronomiya (Moscow), V. 7, No. 2, 1967 P 341-342

Descriptors: *Boundary layer, *Geomagnetic field, *Magnetosphere, Boundary, Explorer satellite, Field, Geomagnetic, Interplanetary, Layer, Observation, Plasma.

For abstract, see STAR 05 15.
N67-28940 HC$3.00 MF$0.65

MESOSPHERIC-STRATOSPHERIC COUPLING,
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
W. C. Heard. 1 May 67, 39p Scientific-297
Grant NSF-GP-4622
Rept. on Ionospheric Research.

Descriptors: (*Mesosphere, *Electron density), (*Stratosphere, Temperature), Pressure, Meteorological parameters, Periodic variations, Correlation techniques, Wind, Tables, Electrons, Ionosphere.

An investigation of mesopheric-stratospheric relationships showed no coupling between mesopheric electron density and collision frequency, and stratospheric temperature or constant-pressure heights. A significant correlation between stratospheric temperature and upper stratospheric and mesopheric density and pressure up to 70km was found. Correlations were largely due to covariant seasonal changes, and only partly due to short-period changes. No evidence of short period, dynamic zonal wind coupling was found, although zonal winds at different levels exhibited similar seasonal changes. (Author)
PB-174 939 HC$3.00 MF$0.65

4B. METEOROLOGY

THE CHARACTERISTICS OF ATMOSPHERIC PROCESSES ON DAYS WITH A LOW CLOUD COVER,
Foreign Technology Div Wright-Patterson AFB Ohio
K. G. Abramovich. 28 Mar 67, 30p Rept no. FTD-MT-66-23
TT-67-62097
K Kharakteristike Atmosfernykh Protsessov v din s Nizhnei Oblachnostyu, edited machine trans. of Tsentralnyi Institut Prognozov. Trudy (USSR), n136 p12-26 1964.

Descriptors: (*Cloud cover, *Meteorological phenomena), Atmosphere, Heat transfer, Humidity, Atmospheric temperature, Atmospheric motion, USSR.

The low cloud cover is considered in different synoptic processes, the objective evaluation of which is accomplished with the aid of the quantitative characteristics of the transfer rates, advective changes in temperature and humidity, vertical motions, turbulence and also local pressure changes. The differences in the values of indicated parameters make it possible to separate three main groups of processes that are also distinguished by certain properties of the lower layer of the atmosphere, in which there occurs formation of the lower-layer cloud cover. (Author)
AD-653 509 HC$3.00 MF$0.65

AN OBJECTIVE TECHNIQUE FOR FORECASTING STRATUS AND ADVECTION FOG AT SUFFOLK COUNTY AIR FORCE BASE WESTHAMPTON BEACH, NEW YORK,
Weather Squadron (12) Suffolk County AFB NY Detachment
William A. Lovisz. 12 May 67, 13p

Descriptors: (*Fog, *Weather forecasting), Long Island sound, New York, Wind, Dew point, Atmospheric temperature, Stratus clouds, Sea water.

The study provides a method of making timely and relatively successful forecasts of low stratus and/or advection fog at Suffolk County AFB, Long Island during the months May through September. Predictors utilized include surface wind velocity, temperature-dew point differences, and sea water temperatures. An independent evaluation of the study using one year's data yielded a skill score of .70 and a percentage correct of 89. (Author)
AD-653 585 HC$3.00 MF$0.65

STUDIES OF THE FORMATION OF PRECIPITATION IN CONVECTION,
Mcgill Univ Montreal (Quebec) Stormy Weather Group
R. C. Srivastava, and Marianne English. Apr 67, 60p Rept no. Scientific-1, MW-47
AFCRL-67-0199
Contract F19628-67-C-0129

Descriptors: (*Cumulus clouds, Atmosphere models), (*Hail, Atmospheric condensation), Storms, Convection (Atmospheric), Meteorological phenomena, Mathematical analysis, Clouds.

The effect of precipitation on the properties of a one-dimensional non-entraining cumulus is studied by numerically integrating the equation of motion and the equation of conservation of water substance. The initial state is taken to be the steady-state solution of the equations in the absence of precipitation. Two models of precipitation development are considered. In the first model, the cloud water is considered to change into rainwater at a prescribed rate, whenever the cloud water content exceeds a given critical value. The raindrops are assumed to have an exponential size distribution and to grow by coalescing with the cloud drops. In the second model, all the cloud water is considered to change, at a given instant, into raindrops of a given fall speed. The main conclusions are: (1) a downdraft develops in the lower levels, (ii) the cloud grows vertically consequent upon the development of precipitation, and (iii) the updraft and water content execute coupled oscillations. English: Results obtained with a new program for the calculation of hail growth are compared with earlier calculations. It is concluded that growth of hail is actually faster than indicated by the earlier results, but the computed hailstones still contain about 80% liquid. The growth equations are fully derived. (Author)
AD-653 610 HC$3.00 MF$0.65

DEVELOPMENTS IN METEOROLOGICAL SENSORS AND MEASURING techniques to 150,000 FEET, 1966.
Final rept., 1 Mar 66-28 Feb 67,
Thornthwaite (C W) Associates Elmer N J Lab of Climatology
Richard T. Field, David M. Gates, Nathaniel S. Keay, Kenneth F. Hare, and John R. Mather. Jun 67, 183p
ECOM-01919-F
Contract DA-28-043-AMC-01919 (E)

Descriptors: (*Atmospheric sounding, State-of-the-art reviews), (*Meteorological parameters, *Sensors), Meteorological instruments, Bibliographies, Atmospheric temperature, Wind, Humidity, Ozone, Barometric pressure, Density, Solar radiation, Stratosphere, Troposphere, Measurement.

Results of a continuing survey of recent developments in meteorological sensors and techniques for measuring temperature, wind, humidity, ozone, pressure, density and radiation (solar and terrestrial) by balloons and rockets up to about 150,000 feet are presented as an annotated bibliography of 277 items as well as more detailed analyses of the current state-or-the-art and promising developments in each of the seven sensor fields. The report also includes an introduction describing the general meteorological characteristics and thus the instrumental needs in the stratosphere. The text includes 123 references. (Author)
AD-653 622 HC$3.00 MF$0.65

ICEFIELD RANGES CLIMATOLOGY PROGRAM: 1965 DATA PRESENTATION AND PROGRAMMING ANALYSIS.
Arctic Inst of North America Montreal (Quebec)
For primary bibliographic entry see Field 8L.
AD-653 626 HC$3.00 MF$0.65

TERMINAL FORECAST REFERENCE FILE FOR ENT AIR FORCE BASE (PETERSON FIELD), COLORADO SPRINGS, COLORADO.
Weather Wing (4th) Ent AFB Colo
Dec 65, 136p

Descriptors: (*Weather forecasting, Instruction manuals), (*Colorado, Weather forecasting), Mountains, Mapping, Meteorological charts, Meteorological parameters, Thunderstorms, Rainfall, Air mass analysis, Climatology.

The report consolidates under one cover, a wide variety of forecast studies (both previously published and unpublished) applicable in the Colorado Springs area. Its purpose is to serve as a reference manual for newly assigned forecasters in this local area. (Author)
AD-653 629 HC$3.00 MF$0.65

DEVELOPMENT OF AN IMPROVED LAND-SURFACE FALLOUT MODEL. PART II. ATMOSPHERIC TRANSPORT.
Technical Operations Inc Burlington Mass
For primary bibliographic entry see Field 18C.
AD-653 633 HC$3.00 MF$0.65

FOG DISPERSAL EXPERIMENTS USING PROPANE AT WALLA WALLA, WASHINGTON.
Cold Regions Research and Engineering Lab Hanover N H

For primary bibliographic entry see Field 1E.
AD-653 636 HC$3.00 MF$0.65

A STUDY TO IMPROVE THE LOW-LEVEL METEOROLOGICAL SIMULATOR.
Semiannual rept., no. 1, 15 May 66-15 Jan 67,
Texas A and M Univ College Station
William H. Clayton, and Tom E. Stanford. May 67, 33p Rept no. TAMU-Ref-66-29T
ECOM-02286-1
Contract DA-28-043-AMC-02286 (E)

Descriptors: (*Atmosphere models, Meteorological parameters), Mathematical models, Wind, Atmospheric temperature, Meteorological charts, Vapor pressure, Data processing systems, Digital computers.

The first part of a digital preparation format to provide necessary processing of raw data to a form suitable for General Purpose Analog Computer solution in the Low Level Meteorological Model has been completed. This format has been employed to verify the manual procedures followed in the derivation of the eleven test cases on which the evaluation and refinement procedures of the Low Level Meteorological Model have been based to date. Case studies of the Low Level Meteorological Model have shown that the profile equations for wind, temperature, and vapor pressure are inadequate and replacement relationships have been derived. Computational verification of the new relationships are reviewed. (Author)
AD-653 644 HC$3.00 MF$0.65

RESEARCH ON ATMOSPHERIC OPTICAL RADIATION TRANSMISSION.
Final scientific rept., 1 Dec 65-30 Nov 66,
Mainz Univ (West Germany) Meteorologisch-eophysikalisches Institut
K. Bullrich, E. de Bary, W. Blattner, R. Eiden, and G. Hanel. Jan 67, 127p
AFCRL-67-0207
Contract AF 61 (052)-595

Descriptors: (*Light transmission, Atmosphere), Optical phenomena, Sky brightness, Aerosols, Scattering, Polarization, Absorption, Reflection, Albedo, Refractive index, Sky, Wind, Measurement, Weather, Particle size, Reflectivity, Mathematical analysis, Intensity.

Measurements and computations of the spectral sky radiation close to the sun. Measurements of spectral sky radiation at Haleakala, Maui, Hawaii. Theoretical interpretation of experimental data on the distribution of the spectral sky radiation. Measurements of the reflectivity of calcareous soil for neutral and polarized light. The real part of the mean index of refraction and the mean density of samples of atmospheric aerosol particles. Degree of polarization of twilight intensity. (Author)
AD-653 757 HC$3.00 MF$0.65

MEASUREMENTS OF RADIATIVE FLUX DIVERGENCE IN THE ARCTIC.
Washington Univ Seattle Dept of Atmospheric Sciences
For primary bibliographic entry see Field 4A.
AD-653 808 Not available from CFSTI.

AN EXPERIMENTAL AND THEORETICAL STUDY OF THE MARINE AND CONTINENTAL CLIMATES OF THE POINT CONCEPTION TO MORRO BAY REGION OF CALIFORNIA.
Interim technical rept., Jan 66-Mar 67,
Meteorology Research Inc Altadena Calif
J. A. Roberts. 27 Jun 67, 27p Rept no. MRI67-IR-613
AROD-5833:1-EN
Contract DA-31-124-ARO (D)-427

Descriptors: (*Climatology, *California), (*Marine meteorology, California), Classification, Weather stations, Computers, Wind, Meteorological parameters, Terrain, Maps, Instrumentation, Data processing systems, Aircraft, Data, Tables, Periodic variations, Temperature, Diurnal variations, Velocity, Water.

The report summarizes the first year of work by Meteorology Research, Inc., on 'An Experimental and Theoretical Study of the Marine and Continental Climates of the Point Conception to Morro Bay Region of California.' The objectives of this study are to provide a partial understanding of the marine elements of coastal climatic classification, a better understanding of the effects of meteorology and marine conditions on mesoclimatology of the coast, and a basis for the prediction of weather conditions on coastal areas of similar classifications. The principal instruments used in the program were nine Mechanical Weather Stations; supporting meteorological data were collected by aircraft and field observations and from cooperating observers. A preliminary mesoclimatology of the coastal regions has been prepared. The three principal mesoclimatic types which have been identified are those associated with exposed lowlands, those associated with exposed headlands, and those associated with protected headlands or lowlands. The primary element causing these mesoclimatic differences is wind. A continuing program is now under way to quantify the conditions that have been observed qualitatively during the first year. The final results of the study will be published in a two-volume 'Atlas of mesoclimatology of the Point Conception to Morro Bay Region of California.' (Author)
AD-653 840 HC$3.00 MF$0.65

CONVECTIVE ELEMENTS.
Washington Univ Seattle Dept of Atmospheric Sciences
For primary bibliographic entry see Field 4A.
AD-653 849 HC$3.00 MF$0.65

AN INSTRUMENT FOR DETERMINING THE SPECTRA OF THE ELECTRIC CHARGE OF CLOUD DROPLETS.
Research translation,
Emmanuel Coll Boston Mass Oriental Science Library
Chao Yen-tseng, Shih Wai-guang, and Chen Shi-ming. Feb 67, 23p Rept no. Emm-66-129
TT-67-62152
Contract AF 19 (628)-5073
Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic), v34 n4 p531-8 1964.

Descriptors: (*Clouds, Instrumentation), Drops, Calibration, Periodic variations, Design, Cloud chambers, Sprays, Electric fields, Deflection, Measurement, Electrodes, Sampling, Velocity, Samplers, Evaporation, Thermal properties, Scattering, Electric discharges, Tables, Errors, China.

The paper describes the design, construction and calibration of a simple instrument for determining the spectra of the electric charge of cloud droplets. The instrument was used to evaluate the spectra of the electric charge of droplets produced by sprays from the domestic water supply in a cloud chamber. A preliminary analysis of the results was made. (Author)
AD-653 970 HC$3.00 MF$0.65

A PRELIMINARY STUDY OF THE FLUCTUATIONS OF THE MICROPHYSICAL STRUCTURE OF CLOUD AND FOG IN HENG SHAN.
Research translation,
Emmanuel Coll Boston Mass Oriental Science Library
Hsu Huan-pin. Apr 67, 21p Rept no. Emm-66-130
TT-67-62153
Contract AF 19 (628)-5073
Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic), v34 n4 p539-47 1964.

Descriptors: (*Clouds, *Periodic variations), (*Fog, Periodic variations), Drops, Environmental tests, Physical properties, Errors, Wind tunnels, Sampling, Numerical analysis, Samplers, Time, Stratosphere, Cumulus clouds, China.

The paper studies experimentally the fluctuations of the absolute total concentration of cloud and fog droplets in a natural environment and the spectral profile of cloud drops by means of the continuous sampling technique. It is shown that the cloud drop concentration in the middle and lower regions of stratocumulus exhibit fluctuations with a spatial scale of 1 - 6 meters and that the values of these fluctuations may reach 30 - 100%. Fluctuations in the profiles of the cloud drop spectra are related to variations in concentration. Within the scale of fluctuations, the cloud drop spectra are characterized by the abundance of small droplets in regions of low concentration and large drops in regions of high concentration. Even under the conditions of uniform concentration over a broad range, fluctuations in the droplet spectra could still occur in a small volume because of the stochastic nature of the distribution and dispersion of cloud drops. This type of fluctuation becomes very small in samples of more than 1,000 - 2,000 drops. (Author)
AD-653 971 HC$3.00 MF$0.65

GREENLAND WHITEOUT EXPERIMENTS: SUMMER 1960.
Summary rept.,
Cornell Aeronautical Lab Inc Buffalo N Y
James E. Jiusto, and R. R. Rogers. Nov 60, 43p
Rept no. CAL-RM-1430-P-2
Contract DA-11-190-eng-100

Descriptors: (*Vision, Polar regions), (*Cloud cover, Greenland), Meteorological phenomena, Supercooling, Atmospheric condensation, Fog, Stratus clouds, Carbon dioxide, Soils, Sodium chloride, Calcium compounds, Silver compounds, Carbon black.
Identifiers: Weather modification.

A two-month experimental program was conducted in Greenland to determine the extent to which arctic whiteouts and low clouds could be modified using cloud dissipation techniques. Seven seeding agents, applicable to supercooled or warmer-than freezing clouds, were tried employing aircraft, tethered blimp, and rocket delivery modes. Successful dissipation of supercooled clouds was achieved with dry ice. Seeding materials that were ineffective in dissipating the supercooled clouds or warmer-than-freezing clouds encountered were liquid carbon dioxide, Greenland soil particles, silver iodide, carbon black, calcium chloride, and sodium chloride. Cloud hydrometeor and atmospheric nuclei measurements were made in relation to the modification tests. Specialized seeding equipments for specific arctic operations are recommended.
AD-654 048 HC$3.00 MF$0.65

APPLICATION OF RADAR TO MEASUREMENT OF SURFACE PRECIPITATION.
Semi-annual rept. no. 3, 1 Sep 66-31 Mar 67,
Massachusetts Inst of Tech Cambridge
Pauline M. Austin. May 67, 21p
ECOM-01472-3
Contract DA-28-043-AMC-01472 (E)
See also AD-645 733.

Descriptors: (*Meteorological radar, *Atmospheric precipitation), Meteorology, Measurement, Storms, Snow, Rainfall, Raindrops.

Installation of two new radars operating at 10 cm with a 1.3 degree beam and at 3.2 cm with a 1 degree beam has been completed. They are equipped with logarithmic receivers, pulse integrators, and sweep integrators for quantitative observations. In the investigation of precipitation pat-

terns in various storm types, a study has been made of the structure of thunderstorms in a squall line and also of scattered air mass thunderstorms. Structure and behavior of precipitation associated with coastal cyclones is being analyzed in detail. All available drop size data from sections of the east coast between New England and North Carolina are being scrutinized for the purpose of selecting individual storms which have drop size characteristics significantly different from the average. (Author)
AD-654 127 HC$3.00 MF$0.65

RELATIONSHIPS BETWEEN TROPICAL PRECIPITATION AND KINEMATIC CLOUD MODELS.
Annual rept. no. 1, 1 Nov 66-30 Apr 67,
Travelers Research Center Inc Hartford Conn
G. Arnason, and R. S. Greenfield. Jun 67, 85p
Rept no. 7482-257
ECOM-02192-2
Contract DA-28-043-AMC-02192 (E)

Descriptors: (*Clouds, Mathematical models), (*Atmosphere models, *Computer programs), Convection (Atmospheric), Rainfall, Flow charting, Thermodynamics, Boundary value problems, Tropical regions.

The mathematical formulation and associated finite-difference approximations for the numerical model of a precipitating roll cloud are summarized. With that background, the computer program used to perform the computations in experiments simulating moist convection is described in detail. The program description includes discussion of the input requirements, the internal operations, and the output. The newly developed recovery feature of the program is explained. All options, presently available in the program, are described. The detailed description of the computer program is contained in individual flow diagrams of the main program and the 16 subroutines. In the concluding remarks, the present status of the computer program is given. Finally, the anticipated future plans for the program are outlined. (Author)
AD-654 129 HC$3.00 MF$0.65

ENERGY, MOMENTUM AND MASS TRANSFERS ABOVE VEGETATIVE SURFACES.
Annual rept.,
California Univ Davis Dept of Water Science and Engineering
W. O. Pruitt, D. L. Morgan, F. I. Laurence, and F. V. Jones, Jr. May 67, 79p
ECOM-0447 (E)-1
Contract DA-02-086-AMC-0447 (E)

Descriptors: (*Meteorology, *Scientific research), Grasses, Terrain, Wind, Temperature, Humidity, Momentum, Heat, Water vapor, Instrumentation, Data processing systems.

During the summer and fall of 1966 three comprehensive studies of energy, momentum, and mass transfers above a grass field were conducted at the Davis field site. Of the three studies, one was designed specifically to examine horizontal divergence under fairly strong advection, while the other two were made under essentially non-advection conditions. Chapter I provides information describing the conditions under which the studies were conducted. Included are general weather condition and plots of the energy balance components and leaf temperatures as well as air temperature and wind at 2 meters. A detailed analysis of flux-gradient relationships could not be started in time for inclusion in this report due to problems in programming outlined in Chapter V. Magnetic tapes were produced containing point-by-point data, 1/2-hour means and standard deviations in engineering units for all parameters measured. Chapter II provides a list of instrumentation used and includes detailed descriptions of the new instrumentation for sensing dry-bulb temperature and wet-bulb depression as well as soil temperature. Modification of an air sampling system for determination of 15-minute means of absolute humidity at eight levels is also discussed. An evaluation of wind instrumentation is discussed in detail. The remainder of the report is concerned with modifications in the data recording system, including a conversion from a punch card to an incremental magnetic tape output. Data management and data processing are also discussed. (Author)
AD-654 136 HC$3.00 MF$0.65

METEOROLOGICAL RESEARCHES.
Academy of Sciences (USSR), Moscow.
1966, 136p REPT.-12
in Russian

Descriptors: *International geophysical year (igy), *Meteorology, *Noctilucent cloud, Astronomy, Climatology, Cloud, Earth surface, Geophysical observatory, Geophysics, Humidity measurement, International, Mesopause, Noctilucence, Rocket sounding, U.S.S.R., Upper atmosphere, Year.

For abstract, see STAR 05 15.
67-28021 HC$3.00 MF$0.65

FOG DISPERSAL OVER AIRPORT RUNWAYS BY MEANS OF A MECHANICAL METHOD.
Nebelbeseitgung Ueber Landebahnen Auf Flug-Plaetzen Mit Hilfe Eines Mechanischen Entne-Belungs-verfahrens
Deutsche Versuchsanstalt Fuer Luft- Und Raumfahrt, Troisdorf (West Germany).
. Schmieschek. Mar 67, 19p DLR-FB-67-23, DVL-618
in German, English Summary

Descriptors: *Dispersion, *Fog, *Runway, *Sieve, Airport, Laboratory, Mechanical, Method, Mobility, Plant, Rotary, Visibility.

For abstract, see STAR 05 15.
N67-28676 HC$3.00 MF$0.65

THE SPACE SYSTEM "METEOR" SERVES METEOROLOGISTS.
Volt Technical Corp., Washington, D. C.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 15.
N67-28874 HC$3.00 MF$0.65

RADAR OBSERVATIONS OF A TORNADO THUNDERSTORM IN VERTICAL SECTION.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass. Geophysics Research Directorate.
Ralph J. Donaldson, Jr. Apr 62, 25p
NSSP-8, N62-15366

Descriptors: (*Meteorological radar, *Tornadoes), (*Thunderstorms, Meteorological radar), Oklahoma, Rainfall, Cyclones, Hail, Great Britain, Meteorological phenomena, Trajectories, Radar echo areas, Atmosphere models.

The thunderstorm that produced tornadoes near Geary, Oklahoma on May 4, 1961 was studied by means of a vertically-scanning radar equipped with a two-tone gain switching circuit. The storm configuration was remarkably similar in many respects to the severe hailstorm in England analyzed by Browning and Ludlam. It had an overhang and, at times, a wall and echo-free vault. However, it was not possible to confirm the existence of a period of steady-state conditions in the Geary storm, and it was further complicated by a merger with another storm overtaking it. It also had many precipitation streamers falling through the overhang, which often had cyclonic trajectories. (Author)
PB-174 859 HC$3.00 MF$0.65

THUNDERSTORM CIRCULATIONS AND TURBULENCE STUDIES FROM AIRCRAFT AND RADAR DATA.
Technical memo,
National Severe Storms Lab., Norman, Okla.
James C. Fankhauser, and J. T. Lee. Apr 67, 36p
IERTM-NSSL-32

Descriptors: (*Atmospheric motion, *Radar echo areas), (*Thunderstorms, Scientific research), Meteorological radar, Meteorological charts, Aircraft, Gusts, Storms, Convection (Atmospheric), Oklahoma, Rainfall, Clouds, Energy.

There are 2 reports included under this cover: 'Association Between Atmospheric Turbulence and Radar Echoes in Oklahoma' by J. T. Lee, and 'Some Physical and Dynamical Aspects of a Severe Right Moving Cumulonimbus' by J. C. Fankhauser.
PB-174 860 HC$3.00 MF$0.65

WEATHER CONDITIONS AFFECTING VTOL AIRBUS OPERATIONS IN THE NORTHEAST CORRIDOR.
Technical rept.,
Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
Robert W. Simpson. Dec 66, 44p FT-66-4
Contract C-136-66, C-85-65

Descriptors: (*Weather, *Aircraft), Diurnal variations, Wind, Air traffic, Visibility, Airports, Temperature, Meteorological parameters, Ceiling, Velocity, Weather stations.

A detailed study of hourly weather observations in the Northeast Corridor during the periods 0600-2400 for a ten year period 1944-1958 was made to study the implications of weather affecting the operations of a VSTOL Airbus transportation system. As a result, specifications for an automatic approach to a hover ending at 75 feet above ground, and within 350 feet visibility were determined to achieve weather reliable operations of over 99.5% throughout the year. Examination of high temperatures indicated that a criterion of operation at 95 F at 1000 feet elevation should be used to ensure 99.5% reliability through the summer months over the corridor. The frequency of high winds indicated that a step gust of 30 mph could be used for specifying the aircraft's displacement from a hover position while under an inertially stabilized automatic control system. The study indicates that Category II all weather operations occur about 0.9% of the time, and Category III about 1.3% of the time in the Northeast Corridor. (Author)
PB-174 915 HC$3.00 MF$0.65

OBJECTIVE NUMERICAL PREDICTION OUT TO SIX DAYS USING THE PRIMITIVE EQUATION MODEL -A TEST CASE.
Technical memo.,
National Meteorological Center, Suitland, Md.
A. James Wagner. May 67, 23p WBTM-NMC-39

Descriptors: (*Weather forecasting, Mathematical models), Atmosphere models, Meteorological parameters, Meteorological charts, Air mass analysis, Storms.
Identifiers: Primitive equations.

The report is a brief summary of the results of a test case study using the primitive equations to make numerical predictions out to six days after the initial time. Daily and selected 5-day mean charts of 500-, 700-, and 1000-mb. height and 1000 to 500- and 1000 to 700-mb. thickness, along with their departures from normal, were produced directly from the model. For comparison, the barotropic 500-mb. forecast heights were also obtained, and both primitive and barotropic forecasts were compared with the observed heights and thicknesses. Although the 500-mb. forecasts made from the primitive equation model were not noticeably better or worse than the barotropic fore-

casts on the average over the hemisphere, the 1000-mb, and thickness forecasts were of useful quality even at the 6th day in the test case. The 5-day mean forecast patterns of height and thickness correctly indicated a temperature reversal over the United States and are thus expected to be useful tools in the preparation of the Weather Bureau's 5-day mean extended forecasts. (Author)
PB-174 920 HC$3.00 MF$0.65

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. ADMINISTRATION AND MANAGEMENT

MANAGERS GUIDE TO STANDARD TECHNIQUE FOR REPORTING INFORMATION ON VALUE ENGINEERING,
Ammunition Procurement and Supply Agency, Joliet, Ill. Operations Research Div.
Harvey A. Smith, and Clifford C. Hill. Aug 64, 37p

Descriptors: (*Value engineering, Reports), Personnel, Design, Handbooks, Management engineering, Communication systems.

The purpose of this Manager's Guide is to introduce the STRIVE System Design to Management and Value Engineering personnel. The Guide is presented clearly and concisely to familiarize these personnel with the System and to give them a basis for communicating with their technical staffs when implementing the STRIVE System. The Guide gives a brief synopsis of problems in existing VE Procedures, describes the essential characteristics of a workable solution, and provides a detailed explanation of the STRIVE System as the proposed solution. (Author)
AD-447 561 HC$3.00

MANAGEMENT SCIENCE FRONTIERS: 1970-1980.
Rand Corp Santa Monica Calif
Eric V. Denardo, and Murray A. Geisler. Jun 67, 10p Rept no. P-3612

Descriptors: (*Management engineering, Predictions), Management planning, Decision making, Computers, Decision theory, Sociology, Training, Problem solving.

The following conclusions were made regarding management science in the future. Advances in mathematical programming, decision theory, simulation, etc., will continue, and they will exploit the growing hardware and software capability of computers. New areas will be opened up to management science, especially those dealing with social and public issues and programs. These challenges will add to the breadth of training required of management scientists. Social welfare functions, social costs, and the so-called externalities of private activity will have to be increasingly considered in building new models, in data collection, and in analysis. Also, opportunities will emerge for bringing the decision-maker more directly into the analysis of problems because of computer advances, better measurement techniques for dealing with utility, and greater understanding of the decision-making process. As a result, more management scientists will enter into laboratory and field-testing situations where systematic analysis of the decision-maker is feasible. This will call for greater development and application of psychological and sociological techniques in our management science studies of decision-making and control. (Author)
AD-653 517 HC$3.00 MF$0.65

THEORY, EXPERIMENT OF PRACTICE,
Foreign Technology Div Wright-Patterson AFB Ohio
P. L. Kapitsa. 13 Feb 67, 64p Rept no. FTD-MT-67-17
TT-67-62131
Edited machine trans. of Novoe v Zhizhi, Nauke, Tekhnike, Seriya 9: Fizika Matematika Astronomiya (USSR) n5 p1-46 1966.

Descriptors: (*Management engineering, *Scientific research), Theory, Scientific personnel, Training, Management planning, USSR.

Contents: The scope of scientific work and the role of the Scientist-organizer; Assimilating (Mastering) the achievements of science and technology; Theory, experiment and practice; The unity of science and technology: The efficiency of scientific work; Questions about the organization of scientific work; The institute of physical problems.
AD-653 561 HC$3.00 MF$0.65

A NUMERICAL TAXONOMY METHOD TO EVALUATE AND PREDICT EQUIPMENT PERFORMANCE FROM ENVIRONMENTAL ENGINEERING DATA,
Frankford Arsenal Philadelphia Pa
Maurice H. Simpson. Apr 67, 64p Rept no. FA-R-1847

Descriptors: (*Management engineering, Problem solving), (*Operations research, *Decision making), Mathematical models, Costs, Performance (Engineering), Cybernetics, Computers, Information retrieval, Effectiveness, Interactions, Environment, Documentation, Mathematical prediction, Systems engineering, Army equipment.
Identifiers: Taxonomy.

Environmental engineering seeks solutions to particularized problems about equipment compatability with natural and man-made environments. Since World War II environmental engineering has become costly, time consuming and a big consumer of lead time in product development. However, since World War II considerable environmental effects data about equipment performance has been painstakingly obtained and stored. These data are pertinent and relevant to present day equipment. It is accessible -- yet, it isn't being used. The engineering community continues to design and test rather than 'search' the literature for these environmental effects data. As an element of engineering, information is meaningful only in terms of decision making, and decision making patterns related to physical systems. Raw description doesn't adequately fit this pattern, so the engineer cannot use it. Information retrieval system effectiveness is now measured by the number of hits vs misses of relevant documents retrieved. This is not enough for the engineer, he needs information, not data or some documents that might contain what he is looking for. The proposed method developed herein corrects this situation by converting the raw documental data into usable information directly applicable to the engineer's decision process in terms related to performance of physical systems. It does so by introducing into the information retrieval process a system of numerical taxonomies that are clinically diagnostic of equipment performance characteristics. These taxonomies are descriptive throughout the range from failure to oversuccess and are called 'ENVIRONMENTAL PREDICTORS'.
AD-653 621 HC$3.00 MF$0.65

A RECIPE FOR THE DEVELOPMENT OF COMPLEX SYSTEMS.
Technical note.
Naval Air Development Center Johnsville Pa Aeronautical Electronic and Electrical Lab
Ernest R. Steele. 19 Jun 59, 9p Rept no. NADC-EL-N5955

Descriptors: (*Research program administration, Management engineering), Armed forces procurement, Military requirements, Cost effectiveness, Reports.

The engineering report technique is clearly applicable to military cost-plus-fixed-fee contracts, and most of the features are pertinent to any development contract. One important consideration could be its use to convert a program that is obviously of the cost-plus type, to two fixed-price contracts. With a first fixed-price contract extending through the Analytical Solution, the derived parameter values, if well founded on the current state-of-the-art, form a reasonable basis for the second contract, a fixed-price development. On the other hand, the Analytical Solution report might be a basis for reorienting the program. It is believed that application of the engineering report philosophy as described, will maximize the probability that a given development will be successful. The four reports and the consideration that must be given to their preparation are a recipe for system thinking. When this recipe is followed, the contractor first cleans and checks over his ingredients, and then he builds an abstract reference model, openly derived in the best interest of the buyer. This model is set up in full view as a standard for the subsequent development. All deviations from the characteristics of the model must be explained and justified, not only those deviations that had to be put in, but also those added unknowingly and allowed to remain. (Author)
AD-653 710 HC$3.00 MF$0.65

SOME NEW APPROACHES TO RISK.
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
For primary bibliographic entry see Field 12B.
AD-653 727 HC$3.00 MF$0.65

BIBLIOGRAPHY OF MANAGEMENT ANALYSIS REPORTS, NOTES AND MEMORANDA.
Management analysis memo.,
Office of the Director of Defense Research and Engineering Washington D C Office for Laboratory Management
Maxine H. Weyandt. 15 May 67, 6p Rept no. MAM-67-2

Descriptors: (*Management engineering, Bibliographies), Research program administration, Department of Defense.

A bibliography is presented of studies and reports on the in-house Department of Defense establishments that perform research, development, test and evaluation.
AD-653 740 HC$3.00 MF$0.65

OPTIMAL ALLOCATION IN A PURE CAPITAL MODEL WITH WITHDRAWALS: ASYMTOTIC PROPERTIES AND ALGORITHMS.
Technical rept.,
Stanford Univ Calif Inst for Mathematical Studies in the Social Sciences
Alan Seelenfreund. 31 May 67, 89p Rept no. TR-149
Contract Nonr-225 (50)

Descriptors: (*Decision making, *Management engineering), (*Economics, *Mathematical models), Budgets, Costs, Algorithms, Optimization, Operations research, Control systems, Systems engineering, Transformations (Mathematics), Feasibility studies, Game theory, Theorems, Matrix algebra, Industrial production.

The purpose of the report is to analyze a class of control problems that represent mathematical models of economic processes. Properties of optimal solutions will be investigated from both asymptotic and short-run viewpoints, and specific algorithmic results are presented whenever possible. In addition, a model of economic growth is formulated as a control process and it is shown that the activities associated with the von Neumann equilibrium must be chosen in each period

if the process has proceeded for a sufficient length of time.
AD-653 746 HC$3.00 MF$0.65

SHELTER OCCUPANCY STUDIES-UNIVERSITY OF GEORGIA (1966). VOLUME II. COMMUNITY FALLOUT SHELTER HANDBOOK FOR UNTRAINED MANAGEMENT.
Georgia Univ Athens Civil Defense Research
For primary bibliographic entry see Field 15C.
AD-653 879 HC$3.00 MF$0.65

SHELTER OCCUPANCY STUDIES AT THE UNIVERSITY OF GEORGIA (1966), VOLUME I.
Georgia Univ Athens Civil Defense Research
For primary bibliographic entry see Field 15C.
AD-653 881 HC$3.00 MF$0.65

OPTIMALITY OF MYOPIC INVENTORY POLICIES FOR SEVERAL SUBSTITUTE PRODUCTS.
Stanford Univ Calif Dept of Operations Research
For primary bibliographic entry see Field 15E.
AD-653 885 HC$3.00 MF$0.65

MANAGEMENT INFORMATION SYSTEM,
Rand Corp Santa Monica Calif
N. G. Zaitsev. 10 May 67, 10p Rept no. LT-67-5
TT-67-62156
Trans. of Informatsionno-Upravlyayuschchie Sistemy (USSR), n1 p75-82 1965.

Descriptors: (*Data processing systems, *Management planning), (*Information retrieval, Management planning), Algorithms, Coding, Real time, Scheduling, Input-output devices, USSR, Programming (Computers).

This paper examines problems of the hardware configuration, information content, and organization of a Management Information System being developed for the Institute of Cybernetics of the Academy of Sciences of the Ukrainian SSR. The work is being done at the suggestion of Academician V. M. Glushkov under the leadership of Candidate of Physico-Mathematical Sciences A. A. Stognii. Projects reports prepared in various departments of the Institute of Cybernetics in 1963-64 were used in writing this paper. Among them, the works of V. N. Afanas'ev, V. G Bodnarchuk, E. F. Skorokhod'ko, and V. I. Shurikhin should be mentioned. A great deal of factural material has been collected by the staff of the Department of Scientific and Technical Information, headed by L. S. Kozachkov.
AD-654 011 HC$3.00 MF$0.65

A HEURISTIC MODEL FOR SCHEDULING LARGE PROJECTS WITH LIMITED RESOURCES.
California Univ Los Angeles Western Management Science Inst
For primary bibliographic entry see Field 12B.
AD-654 098 Not available from CFSTI.

STRATEGIES FOR DIVERSIFICATION OF DEFENSE/SPACE COMPANIES.
Washington Univ., St. Louis, Mo. Dept. of Economics.
M. L. Weidenbaum. Jun 67, 40p NASA-CR-84805
Grant NSG-342
Its Working Paper 6704

Descriptors: *Defense industry, *Economics, Atmosphere, Business, Communications, Control, Defense, Hydrography, Industry, Market, Planning, Space, Surface, Transportation.

For abstract, see STAR 05 15.
N67-28770 HC$3.00 MF$0.65

5B. DOCUMENTATION AND INFORMATION TECHNOLOGY

SCIENTIFIC TECHNICAL INFORMATION, NO. 9, 1964: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
20 Jan 67, 83p Rept no. FTD-TT-65-1882
TT-67-62105
Edited trans. of Nauchno-Tekhnicheskaya Informatsiya (USSR), n9 p20-34; 39-47 1964.

Descriptors: (*Data processing systems, *Documentation), (*Chinese language, Syntax), Automation, Libraries, Data storage systems, Punched cards, Grammars, Information retrieval, USSR, Indexes.
Identifiers: Descriptors.

Contents: Information losses and information noise in descriptor IRS and in a UDC-systematized card catalog; Toward a history of the development of punched cards for manual sorting; First conference on mechanization of information and library operations in the Lithuanian SSR; The documentation of documentation; Overlay cards and their areas of application; A first model of a grammar of valences for the syntactical analysis of a Chinese scientific text; The use of electrography in the 'metalexport' foreign trade organization.
AD-653 530 HC$3.00 MF$0.65

COMPATIBLE AUTOMATED LIBRARY CIRCULATION CONTROL SYSTEMS,
Redstone Scientific Information Center Redstone Arsenal Ala
Charles R. Umstead, and Fred E. Croxton. 15 Apr 67, 177p Rept no. RSIC-663
Army Technical Library Improvement Studies (ATLIS) Report-14.

Descriptors: (*Libraries, Dissemination), Automation, Control systems, Punched cards, Data processing systems, Data storage systems, Instruction manuals, Compatibility.

The report describes five more or less standard and highly compatible circulation systems which incorporate a common form of input and which require a minimum of conversion from traditional manual operations. These five systems are: (1) manual system, (2) punch card accounting machine circulation system, (3) small scale control system, (4) large scale control system, and (5) online control system. (Author)
AD-653 591 HC$3.00 MF$0.65

DYNAMIC ADAPTIVE DATA BASE MANAGEMENT STUDY.
Quarterly progress rept. no. 3, 16 Nov 66-15 Feb 67,
Texas Univ Austin Linguistics Research Center
Winfred P. Lehmann, and Eugene D. Pendergraft. May 67, 37p
ECOM-02276-3
Contract DA-28-043-AMC-02276 (E)
See also AD-649 784.

Descriptors: (*Dynamic programming, *Linguistics), (*Information retrieval, Classification), (*Computers, Data), Stability, Monitors, Theory, Effectiveness, Syntax, Performance (Engineering), Management engineering.

The feasibility of dynamic adaptive data base management is being investigated using linguistically specified processors, automatic classification based on clumping theory, and a monitoring system capable of exercising judgment concerning the need for automatic revision of the data base. (Author)
AD-653 640 HC$3.00 MF$0.65

CARD VERSUS BOOK-FORM PRINTOUT IN A MECHANIZED LIBRARY SYSTEM,
Douglas Aircraft Co Inc Santa Monica Calif
F. R. Smith, and S. O. Jones. May 67, 12p Rept no. DAC Paper-4189
Prepared for presentation at Symposium of Special Libraries Association, (no. 58), held in New York, N. Y., from 28 May - 2 June 1967.

Descriptors: (*Libraries, Automation), (*Information retrieval, Data processing systems), Indexes, Costs, Data storage systems, Input-output devices, Effectiveness.
Identifiers: Computer printouts.

The mechanized information retrieval system at Douglas has been operational for 6 years, with the library bibliographic output produced in the form of 3 x 5 cards. Utilizing the same basic retrieval program, the output is now reformatted to generate a book-form printout. This printout provides six (6) reference points--the corporate author index, personal author index, title index, report number index, contract number index, and accession number index. The procedures followed in developing this format, as well as some of the problems created by the change are discussed. Retraining of both the users and the library personnel was accomplished through a gradual introduction of the new methods. The record files for acquisitions required the 3 x 5 cards so the card printout capability was retained to use in conjunction with the book-form printout. The economics of book-form printout as compared to 3 x 5 cards are examined, along with an evaluation of the new program and its interface with the existing mechanized system. (Author)
AD-653 697 HC$3.00 MF$0.65

TECHNICAL WRITING: A KEY TO COMPUTERIZED INFORMATION RETRIEVAL,
Douglas Aircraft Co Inc Santa Monica Calif
S. O. Jones. 1967, 24p Rept no. DAC Paper-4496
Presented to the International Technical Communications Conference of the Society of Technical Writers and Publishers (14th), Chicago, Illinois, 24-27 May 1967.

Descriptors: (*Information retrieval, Effectiveness), (*Language, Effectiveness), Standardization, Indexes, Reports, Documentation, Vocabulary, Grammars, Computers.
Identifiers: Technical writing, KWIC index, KWOC index.

The future success of mechanized retrieval of information from published material lies, in a large part, in the hands of the technical writer. The context is only as usable as its format when current retrieval methods are used. Examples are given of confusion arising through nondefinitive titles, particularly where permuted indexes, such as Key-Word-In-Context (KWIC) and Key-Word-Out-of-Context (KWOC), are used. The appearance of an article in several different publications is another source of difficulty for the information retrieval system. How the creation of separate entries for the same item can damage the integrity of an information system is shown. A plea is made to the technical writers for understanding the needs of the second generation of reader. Steps which can be taken without censoring the language by replacing all synonyms and near-synonyms with a single term are indicated. The use of meaningful titles, standardization of citations, and several other areas are explored from the viewpoint of the information specialist. (Author)
AD-653 726 HC$3.00 MF$0.65

MANAGEMENT INFORMATION SYSTEM,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5A.
AD-654 011 HC$3.00 MF$0.65

R AND D ABSTRACTS. VOLUME 20 NUMBER 7, 1-15 APRIL 1967.
Ministry of Technology London (England) Technical Information and Library Services
Apr 67, 65p

Descriptors: (*Scientific research, *Abstracts), Acoustics, Communication systems, Aircraft, Computers, Astronomy, Food, Explosive materials, Fluidics, Electric power production, Heat, Electron tubes, Instrumentation, Machine tools, Lubrication, Chemistry, Metallurgy, Plasma physics, Computers, Radar, Great Britain.

Contents: Acoustics and vibrations; Aerials; Aerodynamics; Aerospace engineering - general; Aircraft; Aircraft equipment and flight control systems; Aircraft instruments; Air transport; Ammunition; Astronomy and cartography; Biology and medicine; Cables; Chemical, biological and radiological warfare; Chemistry; Circuits - pulse, digital, printed and potted; Communication systems; Communication theory; Computers and data processing; Containers and packaging; Corrosion and protection; Documentation; Electrical engineering; Electrical power; Electrical testing and instruments; Electricity and magnetism; Electroacoustic apparatus; Electromagnetic propagation; Electron tubes; Electronic components; Electronic countermeasures; Engines; Explosives and propellants; Fires and firefighting; Fluid dynamics; Food; Fuel and heating; Geology and geophysics; Guided missiles; Health and safety, Heat, thermodynamics, combustion; Hydraulic fluids; Instrumentation; Insulators, dielectrics; Land transport and vehicles; Lines, networks, filters and waveguides; Lubrication and bearings; Machine tools, machining; Magnetic devices and materials; Materials (non-metallic); Mathematics; Mechanical engineering; Mechanical properties of materials; Mechanics; Metallurgy; Meteorology; Military engineering; Military science; Military vehicles; Navigation; Nuclear, atomic and molecular physics; Nuclear reactor technology and nucleonics; Operations research; Optics and infra-red systems; Oscillators and amplifiers; Parachutes; Photography; Plasma physics; Psychology; Quartermaster equipment; Radar; Radio. (Author)
AD-654 034 HC$3.00 MF$0.65

LABORATORY ANIMAL SCIENCE. A REVIEW OF THE LITERATURE FOR APRIL-JUNE 1966. ABSTRACTS 124-468, ISSUE 2,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
ANL-7300 HC$3.00 MF$0.65

PUBLICATIONS OF THE NORTHEASTERN FOREST EXPERIMENT STATION, 1950-1965.
Northeastern Forest Experiment Station, Upper Darby Pa.
For primary bibliographic entry see Field 2F.
PB-174 861 HC$3.00 MF$0.65

SANDIA CORPORATION REPRINTS, MONOGRAPHS, AND RESEARCH COLLOQUIA TITLE LIST, 1963-1966.
Sandia Corp., Albuquerque, N. Mex.
Mar 67, 76p
Contract AT (29-1)-789

Descriptors: (*Documentation, Bibliographies), (*Subject indexing, Scientific research), Reports, Technical information centers, Nuclear physics, Nuclear engineering.

For abstract, see NSA 21 13.
SC-R-67-1060 HC$3.00 MF$0.65

INDEX TO NUCLEAR CHEMISTRY DIVISION ANNUAL REPORT, 1966.
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 21 13.
UCRL-17299-Supple HC$3.00 MF$0.65

5C. ECONOMICS

A METHOD FOR SELECTING CONTRACT COST INCENTIVES,
Rand Corp Santa Monica Calif
Ralph E. Miller. Mar 67, 74p Rept no. RM-5122-PR
Contract F44620-67-C-0045

Descriptors: (*Contracts, Cost effectiveness), (*Government procurement, Decision making), Selection, Costs, Probability, Economics.
Identifiers: Incentive contracting.

Selection of an appropriate sharing rate for cost incentive contracts might save the Federal Government large sums of money each year. Theoretical criteria for making this choice have long been known; however, no results have been established because suitable empirical analyses of the problem are lacking. The memorandum considers the empirical evidence necessary for determining appropriate sharing proportions. It shows what data are needed, indicates how they should be used, and proposes a method for collecting them. (Author)
AD-653 508 HC$3.00 MF$0.65

PROCUREMENT: MULTIPLE INCENTIVE CONTRACTING, SCIENTIFIC CONTRACTING WITH ACCENT ON TRADE-OFF,
Army Aviation Materiel Command St Louis Mo
Norman H. Smith. May 67, 115p
DA-PAM-715-3

Descriptors: (*Contracts, *Procurement), Decision making, Costs, Cost effectiveness, Analysis, Management engineering.
Identifiers: Incentive contracting.

Incentive contracts, those contracts in which the seller is rewarded (or penalized) according to performance achieved, can work to the advantage of the seller or the buyer, to both, or to neither. The report emphasizes the need for a method of analysis of incentive arrangements so that the true relationships between cost and performance and their influence on fee earned may be known in advance of negotiation or signing of a contract. The report is written primarily for management and has little of the technical details. There are many examples with graphs showing the relationship of cost, performance and fee. (Author)
AD-653 643 HC$3.00 MF$0.65

THE STRUCTURE OF ECONOMIC MODELS,
George Washington Univ Washington D C Logistics Research Project
For primary bibliographic entry see Field 12B.
AD-653 728 HC$3.00 MF$0.65

APPROXIMATE ALGORITHM FOR THE FIXED CHARGE CAPACITATED SITE LOCATION PROBLEM.
Technical rept.,
Stanford Univ Calif Operations Research House
Geza Jandy. Apr 67, 41p Rept no. TR-67-3
Contracts DAHC04-67-C-0028, N00014-67-A-0112-0011

Descriptors: (*Site selection, Economics), (*Models (Simulations), Site selection), Theorems, Algorithms, Optimization, Warehouses, Costs, Mathematical analysis.

An approximate algorithm for the fixed charge, capacitated site location problem is presented. Numerical examples are used to justify the reasonableness of certain steps of the algorithm. The suboptimal algorithm is shown to result in the optimal solution under certain conditions. The algorithm also establishes bounds that can be used to reduce significantly the number of combinations that need to be examined in any partial enumeration algorithm for determining the exact solution. The algorithm can also be used to determine investments time-phased over several periods. (Author)
AD-653 787 HC$3.00 MF$0.65

ECONOMIC THEORY OF INFORMATION (LECTURE NOTES),
California Univ Los Angeles Western Management Science Inst
For primary bibliographic entry see Field 12B.
AD-654 163 HC$3.00 MF$0.65

METHODS OF GOVERNMENT ASSISTANCE TO RESEARCH AND DEVELOPMENT.
Washington Univ., St. Louis, Mo. Dept. of Economics.
M. L. Weidenbaum. Jun 67, 21p NASA-CR-84820
Grant NSG-342
Its Working Paper 6705

Descriptors: *Economics, *Industry, *Research project, *Technology, Bibliography, Development, Expansion, Finance, Government, Growth, Mechanism, Program, Project, Research, Science.

For abstract, see STAR 05 15.
N67-28758 HC$3.00 MF$0.65

STRATEGIES FOR DIVERSIFICATION OF DEFENSE/SPACE COMPANIES.
Washington Univ., St. Louis, Mo. Dept. of Economics.
For primary bibliographic entry see Field 5A.
For abstract, see STAR 05 15.
N67-28770 HC$3.00 MF$0.65

SWITZERLAND.
10th ed.
International Customs Tariffs Bureau, Brussels (Belgium).
Mar 67, 10p
Pub. as suppl. no. 2 to International Customs Journal Bull-1.

Descriptors: (*Commerce, *Switzerland), (*Costs, Commerce), Industrial production, Statistical data, Law.
Identifiers: Customs laws, Tariffs.

Contains latest changes to customs tariff.
PB-169 265-2 HC$3.00 MF$0.65

UNITED STATES OF AMERICA.
11th ed.
International Customs Tariffs Bureau, Brussels (Belgium).
Mar 67, 46p
Pub. as suppl. no. 2 to International Customs Journal Bull-21.

Descriptors: (*Commerce, *United States), (*Costs, Commerce), Industrial production, Statistical data, Law.
Identifiers: Customs laws, Tariffs.

Contains the latest changes to the customs tariff.
PB-169 293-2 HC$3.00 MF$0.65

BELGIUM-NETHERLANDS-LUXEMBURG (BENELUX).
6th ed.
International Customs Tariffs Bureau, Brussels (Belgium).

Mar 67, 28p
Pub. as suppl. no. 2 to International Customs Journal Bull-8.

Descriptors: (*Commerce, *Belgium), (*Netherlands, Commerce), (*Costs, Commerce), Industrial production, Statistical data, Law.
Identifiers: Customs laws, Tariffs, Luxemburg.

Contains latest changes to customs tariff.
PB-170 849-2 HC$3.00 MF$0.65

REPUBLIC OF THE PHILIPPINES.
6th ed.
International Customs Tariffs Bureau, Brussels (Belgium).
Mar 67, 14p
Pub. as suppl. no. 2 to International Customs Journal Bull-43.

Descriptors: (*Commerce, *Philippines), (*Costs, Commerce), Industrial production, Statistical data, Law.
Identifiers: Customs laws, Tariffs.

Contains the latest changes to the customs tariff.
PB-173 296-2 HC$3.00 MF$0.65

MALAGASY REPUBLIC.
1st ed.
International Customs Tariffs Bureau, Brussels (Belgium).
Jan 67, 6p
Pub. as suppl. no. 1 to International Customs Journal Bull-107.

Descriptors: (*Commerce, *Madagascar), (*Costs, Commerce), Industrial production, Statistical data, Law.
Identifiers: Malagasy Republic, Tariffs, Customs laws.

Contains the latest changes to customs tariff.
PB-173 872-1 HC$3.00 MF$0.65

PORTUGAL.
9th ed.
International Customs Tariffs Bureau, Brussels (Belgium).
Feb 67, 35p
Pub. as suppl. no. 1 to International Customs Journal Bull-9.

Descriptors: (*Commerce, *Portugal), (*Costs, Commerce), Industrial production, Statistical data, Law.
Identifiers: Tariffs, Customs laws.

Contains the latest changes for the schedule of customs duties applicable to goods entitled to E.F.T.A. rates.
PB-174 309-1 HC$3.00 MF$0.65

A COUNTY WATER TRANSMISSION SYSTEM FOR ST. CLAIR COUNTY, MICHIGAN.
Hubbell, Roth and Clark, Inc., Bloomfield Hills, Mich.
May 67, 112p
Availability: Original document in color until exhausted. Prepared in cooperation with Economic Development Administration, Washington, D.C.

Descriptors: (*Economics, *Michigan), (*Water supplies, Michigan), Population, Design, Recreation, Feasibility studies, Costs, Management planning, Water wells, Industries, Urban areas, Employment, Maps, Tables.
Identifiers: Area Redevelopment.

Contents: Description and characteristics of the area; Population projections; Existing water supply facilities; Projected water demands; City of Detroit water supply plan; Results of a county-wide attitude survey; Ground water in St. Clair County; Proposed transmission system; Economic impact of proposed system; Economic feasibility; Administration. (Author)
PB-174 800 HC$3.00 MF$0.65

COMPREHENSIVE FINAL REPORT. PHASE I. EXPLORATION AND PROJECT IDENTIFICATION. PHASE II. PROJECT DEFINITION, CONCEPTUAL PLANS AND TENTATIVE BUDGET; FALL RIVER, MASSACHUSETTS, WATERFRONT DEVELOPMENT.
Allied Engineers and Architects, Inc., St. Louis, Mo.
Jun 67, 121p ER-6701
Contract C-207-66

Descriptors: (*Economics, *Massachusetts), (*Industries, Massachusetts), (*Commerce, Massachusetts), Rivers, Rehabilitation, Water traffic, Roads, Bridges, Railroads, Costs, Feasibility studies, Budgets, Employment, Recreation, Organizations, Urban areas, Management planning.
Identifiers: Area Redevelopment.

Content: General findings applicable to small U. S. Atlantic coast ports; Criteria used for selecting projects to be studied in detail; The needs for non-waterfront supporting activities; Findings arising out of detailed study of waterfront industrial park; Findings arising out of detailed study of administrative plan for implementing waterfront development; Findings arising out of detailed study of downtown waterfront rehabilitation; Supporting activity by local and state organizations; Specific implementation procedures and budget-waterfront industrial park; Details of administrative plan for implementing waterfront development; Specific implementation procedures and budget-downtown waterfront rehabilitation; Procedures employed; Historic use of port of Fall River; Present waterfront activities; New and expanded waterfront activity; Coordinated non-waterfront activity; Waterfront industrial park - conversion of country club property and land lying between it and North Main Street to industrial use. Administrative plan for implementing waterfront development; Downtown waterfront rehabilitation - bulkhead and fill land between City Pier and Slade's Ferry Bridge; Waterfront industrial park; Administrative plan for implementing waterfront development; Downtown waterfront rehabilitation. (Author)
PB-174 850 HC$3.00 MF$0.65

REPORT ON DEMONSTRATION PROJECT TO EVALUATE AND STIMULATE PRODUCTION AND MARKETING OF INVENTIONS BY RESIDENTS OF THE STATE OF IOWA.
Iowa Development Commission Foundation, Inc., Des Moines.
May 67, 66p
Contract Cc5939 (02)
Prepared in cooperation with Economic Development Administration, Washington, D. C.

Descriptors: (*Economics, *Iowa), Patents, Operation, Distribution (Economics), Contracts, Production, Commerce, Law, Costs, Scientific research, Industries, Management engineering, Population, Organizations, Personnel.
Identifiers: Area Redevelopment.

The Iowa Development Commission entered into a contract with the Area Redevelopment Administration, whereby the Commission agreed to establish and operate as a contractor a program of receiving, evaluating and arranging for the possible production and marketing of inventions in Iowa. (Author)
PB-174 857 HC$3.00 MF$0.65

IRELAND.
8th ed., year 1966-1967.
International Customs Tariffs Bureau, Brussels (Belgium).
Feb 67, 380p
Pub. as International Customs Journal Bull-190
Supersedes PB-169 259 and supplements.

Descriptors: (*Commerce, *Eire), (*Costs, Commerce), Industrial production, Statistical data, Law.
Identifiers: Ireland, Tariffs, Customs laws.

Report consists of the following: prohibitions and restrictions; customs duties; customs drawbacks and allowances; excise duties; and excise drawbacks and allowances.
PB-174 889 HC$3.00 MF$0.65

ANGOLA.
4th ed., year 1966-1967.
International Customs Tariffs Bureau, Burssels (Belgium).
Feb 67, 169p
Pub. as International Customs Journal Bull-10.

Descriptors: (*Commerce, *Angola), (*Costs, Commerce), Industrial production, Statistical data, Law.
Identifiers: Tariffs, Customs laws.

Report consists of the following: tariff regimes; special regime; rules of the interpretation of the tariff; and tariff of import duties.
PB-174 890 HC$3.00 MF$0.65

SEYCHELLES.
6th ed., year 1966-1967.
International Customs Tariffs Bureau, Brussels (Belgium).
Mar 67, 20p
Pub. as International Customs Journal Bull-160

Descriptors: (*Commerce, *Indian Ocean islands), (*Costs, Commerce), Industrial production, Statistical data, Law.
Identifiers: Seychelles, Tariffs, Customs laws.

Report consists of the following: schedule of customs duty for various articles; and schedule of exemptions from customs duty.
PB-174 891 HC$3.00 MF$0.65

VIRGIN ISLANDS (BRITISH).
5th ed., year 1966-1967.
International Customs Tariffs Bureau, Brussels (Belgium).
Mar 67, 16p
Pub. as International Customs Journal Bull-113.

Descriptors: (*Commerce, *Virgin Islands), (*Costs, Commerce), Industrial production, Statistical data, Law.
Identifiers: Tariffs, Customs laws.

Report consists of the following: schedule of customs duty for various articles; and schedule of exemptions from customs duty.
PB-174 892 HC$3.00 MF$0.65

SWEDEN.
14th ed., year 1966-1967.
International Customs Tariffs Bureau, Brussels (Belgium).
Jan 67, 210p
Pub. as International Customs Journal Bull-93.
Supersedes PB-169 276 and supplements.

Descriptors: (*Commerce, *Sweden), (*Costs, Commerce), Industrial production, Statistical data, Law.
Identifiers: Tariffs, Customs laws.

Report consists of the following: tariff ordinance; general rules for the interpretation of the tariff; and the schedule of duties.
PB-174 893 HC$3.00 MF$0.65

MAINTENANCE COST STUDIES OF PRESENT AIRCRAFT SUBSYSTEMS.
Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
For primary bibliographic entry see Field 1C.
PB-174 914 HC$3.00 MF$0.65

FEASIBILITY FOR THE ESTABLISHMENT OF A CONTROLLED WOOD SHAVINGS PLANT IN NORTHEAST MINNESOTA.
Saunders (W. B.) and Co., Washington, D. C.
Feb 66, 41p
Prepared in cooperation with the Economic Development Administration, Washington, D. C.

Descriptors: (*Economics, Minnesota), (*Wood Industries), Feasibility studies, Industrial production, Industrial plants, Packaging, Commerce, Material separation.
Identifiers: Area redevelopment.

All aspects of research and the conclusions reached relative to the proposed enterprise are extremely favorable. It was found that the market for the highest grade shavings (Grade I) is a rapidly expanding one and that there is an acute need for the supply of this high-grade product. The comparison of prices for products presently available, although they are not quite comparable with the superior quality of the products to be produced by this new plant, indicates that a fair margin of profit can be generated. Limited research for the opportunity to produce and market bulk and baled poultry litter resulted in the determination that this would not be a desirable business if it were a separate and/or majority activity of the proposed plant. Conversely, as an adjunct to the production of controlled shavings for laboratory use, it is a desirable activity since it will result in an opportunity to utilize wood waste (bark), afford additional utilization of plant equipment and generate additional employment. It is our summary recommendation that the final design studies, site selection and erection of the plant be undertaken as soon as feasible. We believe that this enterprise, if it were to be partially financed by loans within the framework of the Public Works and Economic Development Act of 1965, represents a qualified situation. (Author)
PB-174 918 HC$3.00 MF$0.65

5D. HISTORY, LAW, AND POLITICAL SCIENCE

TEMPER AS A MODEL OF INTERNATIONAL RELATIONS: AN EVALUATION FOR THE JOINT WAR GAMES AGENCY DEPARTMENT OF DEFENSE.
Simulmatics Corp Cambridge Mass
For primary bibliographic entry see Field 15G.
AD-653 606 HC$3.00 MF$0.65

5E. HUMAN FACTORS ENGINEERING

EMPIRICAL HUMAN-FACTORS INVESTIGATION OF DISPLAY DESIGN.
Franklin Inst Research Labs Philadelphia Pa
For primary bibliographic entry see Field 17G.
AD-653 470 HC$3.00 MF$0.65

PERFORMANCE MEASURES FOR HUMAN FACTORS ENGINEERING EVALUATION OF EARL EQUIPMENT.
Dunlap and Associates Inc Darien Conn
For primary bibliographic entry see Field 6K.
AD-653 627 HC$3.00 MF$0.65

IMPROVED EQUIPMENT ARRANGEMENTS FOR TRACON ROOMS.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17G.
AD-653 871 HC$3.00 MF$0.65

HUMAN ENGINEERING AS A SCIENTIFIC DISCIPLINE.
Die Anthropotechnik Als Wissenschaftliche Disziplin
Technische Univ., Berlin (West Germany). Institut Fuer Flugfuehrung Und Luftverkehr.
R. Bernotat. 1966, 23p DGRR/WGLR PAPER-66-086
in German, English Summary Presented At the Ann. Joint Meeting grr/Wglr, Bad Godesberg, W. Germany, Oct. 1966

Descriptors: *Human engineering, *Man-machine system, Acclimatization, Adaptation, Conference, Cybernetics, Engineering, Factor, Germany, Human, Machine, Man, Mental, Performance, Reaction, Simulator, Stress (biol), System.

For abstract, see STAR 05 15.
N67-27931 HC$3.00 MF$0.65

5G. LINGUISTICS

DYNAMIC ADAPTIVE DATA BASE MANAGEMENT STUDY.
Texas Univ Austin Linguistics Research Center
For primary bibliographic entry see Field 5B.
AD-653 640 HC$3.00 MF$0.65

MORPHOLOGICAL ANALYSIS OF THE MECHANICALLY TRANSLATED GEORGIAN LANGUAGE,
Foreign Technology Div Wright-Patterson AFB Ohio
L. Thamarashvili. 27 Mar 67, 16p Rept no. FTD-HT-66-446
TT-67-62140
Edited trans. of Akademiya Nauk Gruzinskoi SSR. Tiflis. Institut Elektroniki, Avtomatiki i Telemekhaniki. Trudy, v4 n4 p11-8 1963.

Descriptors: (*Language, *Linguistics), Machine translation, Syntax, Analysis, USSR, Semantics.
Identifiers: Georgian language, Morphology.

The article points out that one of the difficulties in morphological analysis in machine translation from Georgian is that prefixation as well as suffixation characterize this language. Putting the bases plus prefixes in the dictionary increases the extent of the lexicon. It is proposed to separate the prefixes. Here new problems arise: the spelling of a prefix sometimes coincides with the beginning of some base; a word may have 1-3 prefixes; the base or another prefix may follow a prefix. The base or prefix and a number of prefixes is thus analyzed: if a word form and a dictionary unit are congruent the word contains a base, otherwise a prefix. If a word has several prefixes the operation continues until the part of the base obtained after chopping off the prefix differs from a dictionary unit. The morphological analysis of Georgian is also complicated because, despite its agglutinative nature, homonymous affixes do occur, i.e., the same affix expresses several meanings. The way to differentiate their meanings is to find their place in the chain of affixes. In cases where morphological analysis cannot determine the meaning of a homonymous affix the question is settled by syntax.
AD-653 954 HC$3.00 MF$0.65

MACHINE RECOGNITION OF TRANSFORMATIONAL GRAMMARS OF ENGLISH.
Final rept., Sep 65-Aug 66,
Brandeis Univ Waltham Mass Dept of English
Samuel Jay Keyser, and Robert Kirk. Jan 67, 74p
AFCRL-67-0316
Contract AF 19 (628)-5524

Descriptors: (*Transformational grammars, Pattern recognition), (*English language, Transformational grammars), Linguistics, Syntax, Computers.

The report is divided into three sections. Section I, written by Robert Kirk, contains a fragment of an English grammar dealing with complement constructions in English. It is based upon the IBM Core Grammar of English by Peter Rosenbaum and Dorita Lochak (Yorktown Heights, 1966), though modified in order to accommodate the Stanley R. Petrick recognition algorithm. The grammar has been tested on the IBM 7094 computer located at the MIT Computation Center in Cambridge, Massachusetts. Section II, written by Samuel Jay Keyser, contains a fragment of an English grammar dealing with questions (other than yes/no questions), relative clause formation and adjective placement. It is chronologically prior to the grammar in Section I and was constructed primarily as a vehicle to test and implement the Petrick recognition algorithm on the IBM 7094 computer. The grammar is not without linguistic interest, and the problems raised by the machine recognitions are discussed in some detail. Section III, written by Samuel Jay Keyser, contains a review of Adverbial Positions in English by Sven Jacobson (Uppsala Dissertation: Stockholm, 1964). (Author)
AD-653 993 HC$3.00 MF$0.65

PERCEPTION OF SEGMENTS OF VCCV UTTERANCES,
Royal Inst of Tech Stockholm (Sweden) Speech Transmission Lab
For primary bibliographic entry see Field 17B.
AD-654 074 Not available from CFSTI.

5H. MAN-MACHINE RELATIONS

EMPIRICAL HUMAN-FACTORS INVESTIGATION OF DISPLAY DESIGN.
Franklin Inst Research Labs Philadelphia Pa
For primary bibliographic entry see Field 17G.
AD-653 470 HC$3.00 MF$0.65

A SURVEY OF VARIOUS INFORMATION DISPLAY DEVICES.
Technical rept.,
Naval Training Device Center Orlando Fla
Elliot B. Kleiman. May 67, 19p Rept no. NAVTRADEVCEN-IH-74

Descriptors: (*Display systems, Reviews), Electroluminescence, Cathode ray tubes, Digital systems, Visual signals.

The report represents a survey of the currently available display equipment that can be controlled by a digital computer. The equipment discussed ranges from simple incandescent readouts to cathode-ray tube displays. The report attempts to very briefly describe the various hardware characteristics and approximate costs of the readout and display field before setting out to design console equipment. (Author)
AD-653 867 HC$3.00 MF$0.65

CIRCAL: ON-LINE CIRCUIT DESIGN.
Massachusetts Inst of Tech Cambridge Dept of Electrical Engineering
For primary bibliographic entry see Field 9E.
AD-654 139 Not available from CFSTI.

AVIONICS REQUIREMENTS FOR ALL WEATHER LANDING OF ADVANCED S S T'S. VOLUME II - STATE OF THE ART REVIEW OF ALL WEATHER LANDING SYSTEM TECHNIQUES FINAL REPORT.
Sperry Phoenix Co., Ariz.
S. S. Osder. Apr 67, 108p NASA-CR-73093
Contract NAS2-4124

Descriptors: *All-weather air navigation, *Avionics, *Instrument landing system, *Supersonic transport, Air, All-weather, Approach, Automatic, Bibliography, Control, Data, Display, Instrument, Jet, Landing, Logic, Navigation, Redundancy, Reference, Reliability, Signal, Supersonic, System, Technique, Transport.

For abstract, see STAR 05 15.
N67-28754 HC$3.00 MF$0.65

5I. PERSONNEL SELECTION, TRAINING, AND EVALUATION

EVALUATION OF SEVERAL EXPERIMENTAL AVIATION SELECTION TESTS,
Naval Aerospace Medical Inst Pensacola Fla
James R. Berkshire. Mar 67, 23p Rept no. NAMI-1003
NAVMED-MF0022.01.02-5001.51

Descriptors: (*Aviation personnel, Selection), (*Psychometrics, Aviation personnel), Intelligence tests, Performance tests, Space perception, Aptitude tests, Correlation techniques, Sociometrics, Predictions, Test construction (Psychology).

The report describes the development and experimental evaluation of several measures intended to augment the present naval aviation selection test battery. These include the 'Altitude Judgment' test, the 'Maneuvers' test, a short-form 'Instrument Comprehension' test, a socioeconomic scale, and ratings of the prestige and security of the aviator's job. (Author)
AD-653 441 HC$3.00 MF$0.65

COMPUTATION OF GROUP JOB DESCRIPTIONS FROM OCCUPATIONAL SURVEY DATA,
Personnel Research Lab Lackland AFB Tex
Wayne B. Archer. Dec 66, 41p Rept no. PRL-TR-66-12

Descriptors: (*Job analysis, *Air force personnel), Medical personnel, Performance (Human), Classification.

The analysis of occupational survey data is demonstrated in detail, using miniature examples. Beginning with the responses of 10 incumbents to a job inventory consisting of 10 task statements, composite job descriptions are derived for (a) special groups of incumbents, selected on the basis of background information data; and (b) job type members, identified by an automated job clustering program. Computer outputs from both types of analyses are illustrated and explained. (Author)
AD-653 543 HC$3.00 MF$0.65

DESCRIBING AIRMAN PERFORMANCE IN THE ADMINISTRATIVE CAREER LADDER BY IDENTIFYING PATTERNS OF TRAIT RATINGS,
Personnel Research Lab Lackland AFB Tex
Llewellyn N. Wiley. Nov 66, 56p Rept no. PRL-TR-66-13

Descriptors: (*Performance tests, *Air force personnel), Predictions, Statistical analysis, Job analysis, Questionnaires.

Trait ratings were used to account for the variance in airman performance reports and in overall experimental performance ratings. Airmen in the administrative career ladder, DAFSCs 70230, 50, 70, and 70490, across all commands, were rated by supervisors on overall performance and on 65 traits. Current overall airman performance reports (APRs) were obtained from base records. Among the 2,606 sets of ratings with complete data, 1,083 individuals were evaluated twice, representing personnel rated by two supervisors. Broken down by skill levels, the smallest N was 140, for 9-level men who had been rated twice. Using data undifferentiated by skill, in which a man might appear twice if so rated, trait ratings accounted for 70 per cent of the variance in experimental performance ratings and about 43 per cent of the variance in APRs, after grade was removed as a predictor. When data were sorted by skill level, prediction held up in all skills except DAFSC 70270, where it dropped to 60 per cent. Patterns of traits which were more predictive of performance in one skill level than another were found, and these patterns could be sensibly interpreted in terms of the expected demands of the jobs. In a cross-validation against different raters, the predictive advantage of selected patterns was found to be statistically significant for the 5-, 7-, and 9-skill levels. The study is discussed in terms of its implications for criterion development, particularly in respect to its place in the sequence of current criterion research studies. (Author)
AD-653 544 HC$3.00 MF$0.65

THEORY, EXPERIMENT OF PRACTICE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 5A.
AD-653 561 HC$3.00 MF$0.65

PSYCHOLOGICAL RESEARCH IN ELECTRONICS MAINTENANCE TRAINING,
George Washington Univ Alexandria Va Human Resources Research Office
For primary bibliographic entry see Field 5J.
AD-653 620 HC$3.00 MF$0.65

PERFORMANCE MEASURES FOR HUMAN FACTORS ENGINEERING EVALUATION OF EARL EQUIPMENT.
Dunlap and Associates Inc Darien Conn
For primary bibliographic entry see Field 6K.
AD-653 627 HC$3.00 MF$0.65

POST-TRAINING PERFORMANCE CRITERION DEVELOPMENT AND APPLICATION.
Technical repts.
Applied Psychological Services Wayne Pa
14 Jun 67, 15p
Contract Nonr-2279 (00)

Descriptors: (*Performance tests, Naval personnel), Attitudes, Naval training, Motivation, Job analysis, Factor analysis, Psychometrics, Psychophysics, Applied psychology.

The 22 reports listed chronologically pertain to the same general problem: the development and application of criterion instruments to assess the technical proficiency of Fleet personnel. The 22 studies are summarized briefly in terms of the chronological and logical interrelationships among the problem areas that each report considered.
AD-653 712 HC$3.00 MF$0.65

AN EXPERIMENTAL ASSESSMENT OF A GROUND PILOT TRAINER IN GENERAL AVIATION.
Technical rept.,
Miami-Dade Junior Coll Fla
C. R. Phillips, Jr. Jan 66, 102p
FAA-ADS-61
Contract FA-65-WA-1193

Descriptors: (*Flight simulators, Pilots), (*Training devices, Effectiveness), (*Pilots, Training devices), Performance (Human), Flight, Training, Time, Instrument flight.

Experimental flight training was conducted in conjunction with a commercial model ground trainer to determine its effectiveness in contributing to the proficiency level normally obtained by students undergoing a rigidly controlled flight syllabus without use of synthetic training devices. Differential levels of training with the ground trainer was prescribed for three experimental groups of students. All students in the experimental groups were permitted to accelerate their individual training with respect to their demonstrated proficiency. Results indicate that no appreciable reduction in total aircraft training time was in evidence, particularly in view of the additional hours of training performed in the ground trainer. However, aircraft time was reduced from 50 hours to 43 hours but at the cost of ground trainer time. A second phase of the experimental program involving use of the trainer was the instrument training for a control group of students having Private Pilot qualifications. Additionally, physical features and equipments of the trainer were evaluated and comments are included in the discussion. (Author)
AD-653 729 HC$3.00 MF$0.65

AN EXPERIMENTAL ASSESSMENT OF A GROUND PILOT TRAINER IN GENERAL AVIATION.
Technical rept.,
Middle Tennessee State Univ Murfreesboro
H. Miller Lanier, and E. Dean Butler. Feb 66, 37p
FAA-ADS-64
Contract FA-65-WA-1173

Descriptors: (*Flight simulators, Pilots), (*Training devices, Effectiveness), (*Pilots, Training devices), Performance (Human), Flight, Training, Instructors, Instrument flight.

An experiment was conducted to assess the teaching effectiveness of a government furnished ground pilot trainer utilized in instruction designed to develop primary and instrument flight proficiencies. The design of the private pilot study required the selection of three groups of candidates, differential employment of the ground trainer with each of these three groups, and comparison of the measures of training progress and attained proficiency versus a comparison group of pilot candidates taught by the usual methods, i.e. without use of a ground trainer. The instrument rating experiment required the selection of ten pilots, all with minimum IFR experience, to be trained to flight performance required for instrument rating, utilizing the ground trainer combined with flight instruction. Ground trainer instructional hours and aircraft instructional hours required to develop proficiency in primary flight ability and instrument rating ability are reported. An analysis of the data revealed that the ground trainer does not reduce the total number of instructional hours necessary to achieve flight proficiencies but the trainer does reduce the number of aircraft instructional hours ordinarily required in the acquisition of such proficiency. The ground trainer was found to be of most value in developing navigational competence and command ability. (Author)
AD-653 733 HC$3.00 MF$0.65

AN INVESTIGATION OF FLIGHT PROFICIENCY OF STUDENT PILOTS TRAINED IN AN AIRCRAFT EQUIPPED WITH AN AUTOMATIC STABILITY/CONTROL AUGMENTATION SYSTEM.

Technical rept.,
Middle Tennessee State Univ Murfreesboro
H. Miller Lanier, and E. Dean Butler. Feb 66, 10p
FAA-ADS-68
Contract FA-65-WA-1173

Descriptors: (*Pilots, Performance tests), Students, Training planes, Aircraft, Flight, Automatic, Stabilization systems, Control systems, Training.

Competency was evaluated at the completion of training through three separate flight checks assessing pilot proficiency of manually controlling aircraft equipped with and without a stability augmentation system. Results indicated that pilot competency was not adversely affected by training received in an aircraft equipped with such a device and even contributed to cross country proficiency by relieving pilot workloads. (Author)
AD-653 734 HC$3.00 MF$0.65

AN EXPERIMENTAL ASSESSMENT OF A GROUND PILOT TRAINER IN GENERAL AVIATION.
Technical rept.,
Ohio State Univ Columbus Dept of Aviation
G. Courtney Chapman. Feb 66, 78p
FAA-ADS-63
Contract FA-65-WA-1179

Descriptors: (*Flight simulators, Pilots), (*Training devices, Effectiveness), (*Pilots, Training devices), Performance (Human), Time, Training, Instructors, Training, Instrument flight.

Three groups of subjects were trained to private pilot proficiency. Each group used a ground pilot trainer in a specified manner in an effort to determine how many hours of ground pilot trainer time can be substituted for aircraft dual instruction. Results of training time required were compared between groups and to a fourth control group not using a trainer. The group that used the trainer the greatest amount before going to the aircraft had significantly less time at private pilot certification and solo. The primary cause for the significant success is attributed to the instructors' influence rather than trainer usage, however. When groups were compared by their total flight time added to ground pilot trainer time (or observer) the fourth control group had the least total time in training. Results are considered to be inconclusive. Ten pilots were also trained to instrument pilot proficiency using a ground pilot trainer in an effort to determine the minimum number of flight hours required to reach certification standards. (Author)
AD-653 736 HC$3.00 MF$0.65

STABILITY/CONTROL AUGMENTATION SYSTEM EVALUATION.
Technical rept.,
Ohio State Univ Columbus Dept of Aviation
Marvin Easter. Feb 66, 27p
FAA-ADS-67
Contract FA-65-WA-1179

Descriptors: (*Pilots, *Training), Training planes, Stabilization systems, Control systems, Performance tests, Effectiveness, Students.
Identifiers: Cherokee aircraft.

A study was made to evaluate competency of pilots trained in aircraft having a stability augmentation system. This is to determine the necessity of issuing restricted certificates to private pilots if they are unable to pass the private flight check by manual operation of controls. This project was to train five students to required flight performance for a private pilot certificate in a Cherokee-140 equipped with the Mitchell AK-153 Stability Augmentation System. When the students reached private pilot proficiency, they were given three flight checks. The first with the system on, the second with it off, and the third in a different aircraft without the stability system. All students passed the checks without difficulty. The results of the project indicate that all students reached private pilot proficiency in an average time. The stability system had no particular effect on the students' control of the aircraft with or without visual references. Therefore, it would seem unnecessary to issue restricted pilot certificates. (Author)
AD-653 742 HC$3.00 MF$0.65

VALIDATION OF THE COMMANDER'S EVALUATION REPORT AND THE MOS EVALUATION TEST FOR FIELD ARTILLERY CREWMEN MOS CODE 141.6 (13B40),
Army Enlisted Evaluation Center Indianapolis Ind
John D. Kraft. Jun 67, 24p Rept no. Technical Research Study-66

Descriptors: (*Psychometrics, *Army personnel), Military psychology, Performance tests, Statistical analysis, Performance (Human).
Identifiers: Evaluation.

The present validation report furnished pertinent validity data for the commander's evaluation report (CER) and the MOS evaluation test for Field Artillery Crewman, MOS Code 141.6, which were administered in the May 1965 evaluation period. The empirical validities were obtained for all predictors and combinations of predictors. The most appropriate utilization of these existing predictors was determined. Evaluative statistics were provided for CER appraisal and revision. The following three methods of combining predictors were compared for the development of raw composite scores (RCS's): (1) the present procedure of combining the total MOS evaluation test and the total CER as prescribed by Department of the Army directive; (2) the weighting of the total MOS evaluation test and the total CER by statistical procedures; and (3) the weighting of the subdivisions of the MOS evaluation test and CER by statistical procedures. The validities, after shrinkage, by method were: Method (1), .54; method (2), .52; and method (3), .63. Computational formulas were provided under Discussion for the development of RCS's by methods (2) and (3). Method three was found to be superior to the others. The total CER had a validity coefficient of .48 (significant at the .01 level) and the total MOS evaluation test had a validity coefficient of .48 (significant at the .01 level). Partial correlation coefficients for the total CER and the CER scales with the MOS evaluation test held as a constant indicated that two of the 12 scales were independently valid predictors of job performance. (Author)
AD-653 783 HC$3.00 MF$0.65

INDIVIDUAL AND SMALL-UNIT TRAINING FOR COMBAT OPERATIONS,
George Washington Univ Alexandria Va Human Resources Research Office
T. O. Jacobs, Joseph S. Ward, Theodore R. Powers, Clay E. George, and Howard H. McFann.
May 67, 61p Rept no. Professional Paper-21-67
Contract DA-44-188-ARO-2
Presented at Army Human Factors Research and Development Annual Conference (12th), Fort Benning, Georgia, October, 1966.

Descriptors: (*Military training, Efficiency), Human engineering, Training devices, Army training, Leadership, Rifles, Teaching methods, Teaching machines, Programmed instruction, Symposia.

Contents: Training for modern combat operations; A case study of the development of an individual combat training program; The foundations for leader training; Training for coordination within rifle squads; Individualization of instruction.
AD-653 845 HC$3.00 MF$0.65

COMPARISON OF THREE MODES OF INSTRUCTION FOR THE OPERATION OF A COMPLEX OSCILLOSCOPE.
Final rept., Feb 64-Feb 66
Applied Science Associates Inc Valencia Pa
John D. Folley, Jr., Robert H. Woods, and John P. Foley, Jr. Mar 67, 71p
AMRL-TR-66-195
Contract AF 33 (615)-1414

Descriptors: (*Teaching methods, Electronic technicians), (*Oscilloscopes, Operation), Military training, Effectiveness, Training devices, Training.

A field experiment was conducted to compare the effectiveness of three modes of instruction in the use of the AF 1807 oscilloscope (Tektronix 545A). Skilled electronic technicians of the U. S. Air Force Security Service served as subjects. One group was trained with an audio-visual instructional program, and a second group with a book form of the same program. The program combined verbal instruction and responses with practice on an oscilloscope. A third group was trained in the manner normally used at the school where the study was conducted. Analysis of variance on test scores indicated superiority of both forms of the program over the conventional instructions with no difference in effectiveness between programs. Electronic aptitude, as measured by the Airman Qualifying Examination, correlated significantly with test scores for the conventionally trained group and for all subjects together. (Author)
AD-654 004 HC$3.00 MF$0.65

PRELIMINARY VALIDITY REPORT OF THE MOS EVALUATION TEST FOR FIELD ARTILLERY CREWMAN MOS CODE 141.6 (13B40),
Army Enlisted Evaluation Center Indianapolis Ind
John D. Kraft. Jun 67, 34p Rept no. Technical Research Study-61

Descriptors: (*Performance tests, Army personnel), (*Psychometrics, Army personnel), Military psychology, Performance (Human), Effectiveness, Artillery units.
Identifiers: Evaluation.

The report furnished pertinent validity data for the MOS evaluation test for Field Artillery Crewman, MOS Code 141.6, which was administered in the May 1965 evaluation period. Statistical bases were provided to allow control, in test revision, over the evaluation test characteristics of mean, standard deviation, reliability, and validity. The evaluation test characteristic of validity was given special attention. Increasing the validity of an evaluation test was considered at both the item and the test outline levels. The statistical rationale and data necessary for this purpose were provided for the use of research psychologists in the Test Development Branch of the US Army Enlisted Evaluation Center. The following conclusions are drawn from the study of the 1965 MOS evaluation test for Field Artillery Crewman, MOS Code 141.6: (1) the total evaluation test had a validity coefficient of .48 (significant at the .01 level); (2) optimal weighting of BSMA's did not significantly increase the validity of the total evaluation test; and (3) further increases in validity should be expected in future administration with proper item selection. (Author)
AD-654 128 HC$3.00 MF$0.65

SHORT COURSE ON HIGHWAY DEVELOPMENT (1st).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
For primary bibliographic entry see Field 13B.
PB-174 808 HC$3.00 MF$0.65

SHORT COURSE ON HIGHWAY DEVELOPMENT (3rd).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.

For primary bibliographic entry see Field 13B.
PB-174 809 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (20th).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
For primary bibliographic entry see Field 13B.
PB-174 822 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (21st).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
For primary bibliographic entry see Field 13B.
PB-174 823 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (22nd).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
For primary bibliographic entry see Field 13B.
PB-174 824 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (25th).
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
For primary bibliographic entry see Field 13B.
PB-174 826 HC$3.00 MF$0.65

5J. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

THE EFFECTS OF THIAZESIM, LSD-25, AND BILATERAL LESIONS OF THE AMYGDALAE ON THE RELEASE OF A SUPPRESSED RESPONSE,
Texas Univ Galveston Medical Branch
Ernest S. Barratt. 1967, 12p
Contract Nonr-1598 (06)
Availability: Published in Recent Advances in Biological Psychiatry v9 p229-40 1967.

Descriptors: (*Conditioned reflex, *Central nervous system), Brain, Psychotropic agents, Lysergic acids, Amphetamines, Inhibition, Control, Reaction (Psychology), Behavior, Cerebellum, Monkeys.
Identifiers: Thiazesim, Amygdala.

The purpose of these experiments was to test the hypothesis that the amygdalae are involved in the release of a suppressed response on a schedule involving a positive reward (food) and response-contingent shock. The following two experimental test conditions consistently caused release of a suppressed bar-pulling response: (1) the administration of thiazesim and (2) bilateral lesions of the amygdalae. Possible mechanisms underlying these changes are discussed. (Author)
AD-653 423 Not available from CFSTI.

EVALUATION OF SEVERAL EXPERIMENTAL AVIATION SELECTION TESTS,
Naval Aerospace Medical Inst Pensacola Fla
For primary bibliographic entry see Field 5I.
AD-653 441 HC$3.00 MF$0.65

PULSE RATE COMPARISONS BETWEEN FLICKER AND INTERMITTENT TONE.
Master's thesis,
Hofstra Univ Hempstead N Y
James Francis Wilde. Jun 66, 39p
Contract Nonr-2252 (01)

Descriptors: (*Sensory perception, Pulse rate), Auditory signals, Visual signals, Auditory perception, Visual perception, Responses, Stimulation, Reaction (Psychology), Theses, Pulse systems.

In a study of Shipley (1964) Ss were asked to indicate when a pulsed auditory stimulus (flutter) appeared different in pulse rate from a pulsed visual stimulus (flicker). On each trial, both stimuli were initially set at the same rate, between 2 and 10 pulses per second, and S changed flutter rate until the flutter appeared different from the flicker. Preliminary data for the present study indicated that Ss perceived both stimuli at the same rate when the difference between flicker and flutter was actually over 100 times as great as Shipley found to be the average change in auditory rate. In addition, on some trials, Ss initially perceived the two stimuli as different when in fact they were equated. When Ss expected to perceive the stimuli the same, the stimuli appeared the same. Only when the method of adjustment was used did the data agree with Shipley's. The data indicated that: (a) Ss are more accurate at pulse rates below four pulses per second, and become less accurate as pulse rate increases, (b) Ss are better able to discriminate between the two stimuli when the auditory pulse rate is lower, than when the visual pulse rate is lower, and (c) the method of constant stimuli yields much different data on intersensory rate comparisons between flicker and pulsed tone, than does the method of adjustment. (Author)
AD-653 457 HC$3.00 MF$0.65

CHANGES IN THE ELECTROGASTROGRAM AND IN BREATHING AMPLITUDE AS INDICATORS OF NAUSEA.
Indiana Univ Bloomington
For primary bibliographic entry see Field 6S.
AD-653 462 HC$3.00 MF$0.65

PROBLEMS IN EXTRAPOLATING FROM PSYCHOLOGICAL EXPERIMENTS.
Technical rept.,
Northwestern Univ Evanston Ill Dept of Psychology
Thomas W. Milburn. 1967, 40p
Contract N00014-67-A-0356-0004

Descriptors: (*Behavior, *Mathematical prediction), (*Group dynamics, *Performance (Human)), Interactions, Accuracy, Social psychology, Scientific research, Psychometrics, Reaction (Psychology), Problem solving.

Psychologists who identify as scientists, and many of their professional colleagues as well, seek to establish laws concerning behavior, and especially human behavior, with the widest possible generality. The objective of establishing general laws of behavior has proved an elusive one. Perhaps one source of difficulty is that, rather than there being a single kind of extrapolational process, there are several. Causal propositions ideally can be generalized not merely from the 'artificial' laboratory to a 'natural' real world, but also across species, across culture, across occasions, across levels (and roles), as well as there being an analogous extrapolation possible from scientific truth seeker to the pragmatic user, the practitioner. Scientific laws are propositions which prove invariant across various transformations; psychologists may well find it worth while to seek to establish general laws with something of the vigor with which they work to achieve experiments with internal validity.
AD-653 480 HC$3.00 MF$0.65

REVIEW OF CLINICAL AND EXPERIMENTAL STUDIES IN CONDITIONAL REFLEXES, PSYCHO AND NEUROPHYSIOLOGY IN U.S.S.R., CZECHOSLOVAKIA AND GREAT BRITAIN JUNE 1966 - SEPTEMBER 1966,
Duke Univ Durham N C Medical Center
For primary bibliographic entry see Field 6P.
AD-653 594 HC$3.00 MF$0.65

A FACTOR ANALYSIS OF SYMBOLIC MEMORY ABILITIES,
University of Southern California Los Angeles Psychological Lab
Mary L. Tenopyr, J. P. Guilford, and R. Hoepfner. Dec 66, 31p Rept no. 38
Contract Nonr-228 (20)
Rept. on Studies of Aptitudes of High-Level Personnel.

Descriptors: (*Memory, Factor analysis), Symbols, Intelligence tests, Behavior, Perception (Psychology), Semantics, Learning, Recall, Test construction (Psychology), Psychometrics, Aptitude tests.

The purposes of this investigation were to determine whether six symbolic-memory abilities hypothesized by the structure-of- intellect model could be demonstrated, and to confirm the existence of five of the behavioral-cognition factors. Twenty-six experimental measures of symbolic memory, ten tests to measure the symbolic-cognition reference factors, two to measure a symbolic-evaluation factor, and two for a semantic-cognition factor were factor analyzed, along with ten tests of behavioral cognition. Tests were administered to 266 tenth-grade students. Pearson r's, or estimates thereof, between pairs of variables were subjected to a principal-components analysis. Nineteen factors were rotated orthogonally to achieve positive manifold, agreement with hypotheses, and simple structure. The six hypothesized symbolic-memory factors were demarcated essentially as anticipated. Memory for symbolic units (MSU) was defined by list-learning tests where order of recall is not important. Tests requiring retention of a concept based on numerical properties or word structure identified memory for symbolic classes (MSC). Memory for symbolic relations (MSR) was indicated by tests requiring memory for rules by which letter series are formed and requiring retention of ways in which one word is changed to make another. The tests that defined memory for symbolic systems (MSS) involved retention of the order in which symbolic stimuli were presented. Memory for symbolic transformations (MST) was identified by tests requiring retention of words formed by changes in the grouping of given ordered letters. Memory for symbolic implications (MSI) was defined by tests of the paired-associates type. (Author)
AD-653 602 HC$3.00 MF$0.65

PSYCHOLOGICAL RESEARCH IN ELECTRONICS MAINTENANCE TRAINING,
George Washington Univ Alexandria Va Human Resources Research Office
William A. McClelland. May 67, 28p Rept no. Professional Paper 22-67
Contract DA-44-188-ARO-2

Descriptors: (*Maintenance, *Training), (*Electronics, *Maintenance personnel), (*Armed forces research, *Military psychology), Army personnel, Applied psychology, Attitudes, Instruction manuals, Maintenance equipment, Psychometrics, Behavior, Systems engineering.

In order to establish a frame of reference for the British audience, the Director of Electrical and Mechanical Engineer's Study Period 1965, Arborfield, England, the Human Resources Research Office's role and mission in Army research and development, the U.S. Army personnel and maintenance systems, and a procedure for curricular control are briefly described. The bulk of the paper is devoted to selected examples of HumRRO research and development in electronics maintenance training. FORECAST, JOBTRAIN, MAINTRAIN, LIMIT, and REPAIR are cited.
AD-653 620 HC$3.00 MF$0.65

PERFORMANCE MEASURES FOR HUMAN FACTORS ENGINEERING EVALUATION OF EARL EQUIPMENT.

Dunlap and Associates Inc Darien Conn
For primary bibliographic entry see Field 6K.
AD-653 627 HC$3.00 MF$0.65

THE ROLE OF 'LYING' IN PSYCHOPHYSIOLOGICAL DETECTION,
Hebrew Univ Jerusalem (Israel) Dept of Psychology
Sol Kugelmass, Israel Lieblich, and Zeev Bergman. 1967. 7p
AFOSR-67-1321
Contract AF 61 (052)-839
Availability: Published in Psychophysiology v3 n3 p312-5 1967.

Descriptors: (*Psychophysiology, *Behavior), (*Galvanic skin response, Detection), Psychometrics, Lie detectors, Effectiveness, Interactions, Reaction (Psychology), Fear, Motivation.

An experiment was designed to examine the role of lying behavior, per se, as the basis for experimental psychophysiological detection of deception. In addition to the standard card-test procedure, a second procedure required the S to say 'yes' to every question posed relating to the card chosen. This variation involved telling the 'truth' in respect to the critical card in contrast to the usual procedure in which he is required to 'lie'. With the use of the galvanic skin response (GSR) channel, significant dection rates were obtained for both procedures with no significant difference between them. Some theoretical issues related to the findings were explored.
AD-653 699 Not available from CFSTI.

POST-TRAINING PERFORMANCE CRITERION DEVELOPMENT AND APPLICATION.
Applied Psychological Services Wayne Pa
For primary bibliographic entry see Field 5I.
AD-653 712 HC$3.00 MF$0.65

CONFERENCE ON CLUSTER ANALYSIS OF MULTIVARIATE DATA, NEW ORLEANS, LA., DECEMBER 9, 10 AND 11.
Final rept.,
Catholic Univ of America Washington D C
Maurice Lorr, and Samuel B. Lyerly. Jun 67. 323p
Contract N00014-67-C-0175
Prepared in cooperation with Bureau of Social Science Research, Inc., Washington, D. C.

Descriptors: (*Psychometrics, *Multivariate analysis), Social sciences, Sociometrics, Factor analysis, Biometry, Personality tests, Social psychology, Iterative methods, Behavior, Computer programs, Algorithms, Diagnosis, Classification, Psychiatry, Statistical analysis, Symposia.
Identifiers: Cluster analysis.

Contents: Some critical issues and problems in cluster analysis; Methods of cluster or typological analysis; Review of clustering methods in biological taxonomy; Mutual development of theory and method in objective analysis of personality structure; Principles of behavioral taxonomy and the mathematical basis of the taxonome computer program; Comparative cluster analysis of variables and individuals (Holzinger Abilities and the MMPI); Comparison of two techniques for finding the minimum sum-squared error partition; Rotating principal axes into approximately mutually exclusive categories; Cluster analysis and the search for structure underlying individual differences in psychological phenomena; the MAXOF clustering model; Multivariate analysis of qualitative data; Classification so as to relate to outside variables; Investigation of reliability of different profile similarity indices.
AD-653 722 HC$3.00 MF$0.65

RESOLUTION OF THE COMMUNICATION DISCREPANCY ISSUE IN ATTITUDE CHANGE,
Gustavus Adolphus Coll St Peter Minn
James O. Whittaker. 1967. 22p
AFOSR-66-2050
Grant AF-AFOSR-62-188
Availability: Published in Attitude, Ego-Involvement and Change p159-77 1967.

Descriptors: (*Attitudes, *Social psychology), Social communication, Perception (Psychology).

Experimental evidence is presented on the effects of communication discrepancy in opinion change. It represents an effort to resolve the contradictory findings of different investigators. Research is presented which relates the effects of different discrepancies to the concepts of 'latitude of acceptance' and 'latitude of rejection.' (Author)
AD-653 732 Not available from CFSTI.

AN INVESTIGATION OF FLIGHT PROFICIENCY OF STUDENT PILOTS TRAINED IN AN AIRCRAFT EQUIPPED WITH AN AUTOMATIC STABILITY/CONTROL AUGMENTATION SYSTEM.
Middle Tennessee State Univ Murfreesboro
For primary bibliographic entry see Field 5I.
AD-653 734 HC$3.00 MF$0.65

STABILITY/CONTROL AUGMENTATION SYSTEM EVALUATION.
Ohio State Univ Columbus Dept of Aviation
For primary bibliographic entry see Field 5I.
AD-653 742 HC$3.00 MF$0.65

INFLUENCE OF SOURCE AND NUMBER OF EXPOSURES ON COMMUNICATION EFFECTIVENESS.
Technical rept.,
Hunter Coll of the City Univ of New York
Walter Weiss, and Henry Solomon. May 67. 61p
Rept no. TR-10
Contract Nonr-4309 (00)

Descriptors: (*Social communication, Effectiveness), Attitudes, Social psychology, Newspapers, Periodicals.

The research had three main purposes: (1) to examine the effects of more than one exposure to a communication on an issue of importance to the subjects; (2) to assess the potential independent and interacting contributions of the author of an article (the primary communicator) and the publication in which the article was presumably printed (the print sponsor); and (3) to check the reliability of data patterns obtained in past research concerning the effects of source and communication on the giving of attitude-supporting reasons and on the stated willingness to engage in certain attitude-supporting actions. The primary effects were due to the communication itself, with source and number of exposures contributing modestly within this general context. Also, the various effects were not found to covary with each other in any simple manner. Discussion of the diverse and complex results included consideration of their relationships to data patterns obtained in previous research. (Author)
AD-653 744 HC$3.00 MF$0.65

EXPERIMENTAL ASSESSMENT OF A LIMITED SENSORY AND SOCIAL ENVIRONMENT: SUMMARY RESULTS OF THE HUMRRO PROGRAM.
Research memo.,
George Washington Univ Alexandria Va Human Resources Research Office
Thomas I. Myers, Donald B. Murphy, Seward Smith, and Charles Windle. Feb 62. 43p
Research sponsored in part by U. S. Army Leadership Human Research Unit, Monterey, Calif.
Rept. on task PIONEER VI.

Descriptors: (*Sensory deprivation, Behavior), Stress (Psychology), Performance (Human), Confinement (Psychology), Attention, Reasoning, Brainwashing, Conformity, Illusions, Anxiety, Experimental design, Reaction (Psychology).

Experiments were designed to appraise the potency of a limited sensory and social environment. Soldier volunteers were confined for a period of four days in dark quiet cubicles which were otherwise physically comfortable. The dearth of sensory experience within the cubicle contrasted markedly with the normal sensory and social experiences of the control group subject during the same period of time. After comparing the experiences and behaviors of cubicle and control group subjects, it was concluded that dark quiet isolation can be a formidable experience. The cubicle subject evidenced feelings of boredom, restlessness, anger, stress, anxiety, disorientation and vague physical symptoms that were only rarely reported by his control group counterpart. Evidence of intellectual inefficiency in the cubicle environment was obtained, both from certain intellectual performance tests given during isolation and from retrospective evaluations of intellectual functioning, again in comparison to the control baseline. The cubicle experience was characterized by vivid and complex visual sensations during the isolation period, as compared to the control condition, although the complexity of these visual events sampled at one point in time after several days of isolation was not distinguishable from that experienced by control Ss who were placed only briefly in a darkened test room. Finally, there were some indications that the monitoring of an auditory signal was enhanced by several days of isolation, at least in comparison to the control group tested in a darkened room. (Author)
AD-653 786 HC$3.00 MF$0.65

COLOR INDUCTION USING ASYNCHRONOUS FLASHES,
Naval Submarine Medical Center Groton Conn
For primary bibliographic entry see Field 6P.
AD-653 806 Not available from CFSTI.

RACIAL ATTITUDE AS A DETERMINANT OF JUDGMENTS OF PLAUSIBILITY,
Colorado Univ Boulder Inst of Behavioral Science
Claire Sellitz, and Stuart W. Cook. 30 Aug 65. 8p
AFOSR-67-1394
Grant AF-AFOSR-436-63
Research supported in part by NSF. Prepared in cooperation with City Coll. of the City of New York.
Availability: Published in The Journal of Social Psychology v70 p139-47 1966.

Descriptors: (*Social psychology, *Attitudes), (*Psychometrics, Interactions), Determinants, Group dynamics, Effectiveness, Education, Analysis of variance, Reaction (Psychology), Correlation techniques.

Wally and Cook suggested that ratings of plausibility might serve as an indirect indicator of attitude. The purpose of the present study was to explore this suggestion by having criterion groups of Ss with known positions on race relations rate the plausibility of arguments for and against segregation. This was one of a battery of measures in a program concerned with evaluating the effectiveness of various techniques for measuring attitudes toward social groups and with interrelations among different aspects of attitude as tapped by different measures.
AD-653 827 Not available from CFSTI.

EFFECT OF SIMULATED SOCIAL FEEDBACK OF INDIVIDUAL TRACKING PERFORMANCE,
Ohio State Univ Columbus
William A. Johnston, and Leon H. Nawrocki. 27 Apr 66. 9p
AFOSR-67-1400
Grant AF-AFOSR-985-66

Availability: Published in Journal of Applied Psychology v51 n2 p145-51 1967.

Descriptors: (*Tracking, *Performance (Human)), (*Group dynamics, *Psychometrics), Feedback, Simulation, Determinants, Social psychology, Errors.

Individual tracking performance was examined under conditions of simulated social feedback. Each of 60 Ss was told he had a partner and that posttrial feedback represented their team performance relative to average tracking ability. Actually, S's feedback represented his individual performance relative to a lenient, moderate, or stringent criterion. The criteria simulated partners of varying ability. Ss blamed their contrived partners for poor scores received under the stringent criterion. Performance of good trackers was not affected by criterion difficulty, but poor trackers performed best under the moderate criterion. The inhibitory influence of the stringent criterion was magnified during a terminal extinction session. The results suggest that criterion difficulty is an important determinant of performance in team and perhaps individual tasks.
AD-653 904 Not available from CFSTI.

THE EFFECTS OF CONTEXT AND OF RATERS' ATTITUDES ON JUDGMENTS OF FAVORABLENESS OF STATEMENTS ABOUT A SOCIAL GROUP,
Colorado Univ Boulder Inst of Behavioral Science
Harold Edrich, Claire Selltiz, and Stuart W. Cook.
8 Jun 65, 13p
AFOSR-67-1403
Grant AF-AFOSR-436-63
Availability: Published in Journal of Social Psychology v70 p11-22 1966.

Descriptors: (*Social psychology, *Attitudes), (*Group dynamics, *Psychometrics), Interactions, Value engineering, Determinants, Distribution, Organizations, Students, Universities.

Median scale values assigned to 30 statements about Negroes by each of 5 groups differing in attitude toward Negroes were compared to values obtained from comparable groups for the same items a year later. The major difference between the two administrations was the total context of items within which the 30 items were judged, the earlier distribution having a high proportion of unfavorable items, the second having almost equal numbers of favorable and unfavorable items. Findings are: (1) Scale values of attitude statements change as a result of change in item context; (2) Unfavorable and favorable items are affected differently by change in context; (3) Groups of raters differing in attitude react differently to change in context; (4) Item type interacts with raters' attitude.
AD-653 916 Not available from CFSTI.

PERCEIVED STRESS, PERFORMANCE, PERSONALITY AND BIOCHEMICAL FACTORS IN HUMANS.
Final rept., 1 Apr 65-31 Oct 66,
Florida Presbyterian Coll St Petersburg Neuro-Sciences Lab
W. F. Angermeier, and E. I. Stevens. May 67, 129p
6571-ARL-TR-67-11
Contract AF 29 (600)-5135

Descriptors: (*Stress (Psychology), *Psychometrics), Personality, Perception (Psychology), Biochemistry, Intelligence tests, Personality tests, Galvanic skin response, Pulse rate, Social psychology.

A study was made to investigate perceived stress, performance, personality and biochemical factors in humans. A total of 250 naive human subjects, both males and females, white and colored, ranging in age from 15 to 22 years were used as subjects to study possible relationships which might exist between (1), perceived stress, (2) personality factors as they appear on the California Psychological Inventory, (3) IQ as measured by the Otis Test, (4) a match-to-sample block test, (5) an analogy problem solving test under stress, (6) change in pupil size, (7) change in heart rate under stress, and (8) galvanic skin response during and after sound-shock conditioning. Possible biochemical differences as they may exist among various subgroups and their possible modification by a program of cultural, perceptual, and dietary enrichment were also investigated. (Author)
AD-653 973 HC$3.00 MF$0.65

THE EFFECT OF SUPERSEDING SIGNALS,
California Univ Santa Barbara Dept of Psychology
Robert Gottsdanker. 6 Feb 66, 17p
AFOSR-67-1402
Contract AF 49 (638)-730
Availability: Published in Quarterly Journal of Experimental Psychology v18 Pt3 p236-49 Aug 1966.

Descriptors: (*Tracking, Performance (Human)), Reaction (Psychology), Reflexes, Visual signals.

Eight adult human subjects were given a step-tracking task in which an occasional second signal within 50, 70, 90, 120, or 240 millisec. called for curtailing or reversing the first command. It was found for inter-signal intervals through 120 millisec. that the shorter the interval the greater was the reduction in amplitude and duration of the majority of responses, with no delay in the effect of the second signal. Where a larger change of response was called for, reversal rather than curtailment, there was a greater effect. A second signal occurring at the 240 millisec. interval (in almost all cases after the start of the response), had no detectable effect. Since the over-all RT period the initial response is not typically impervious to the effect of a second signal. Contrary to the expectations of the uncommitted-period version of the hypothesis of substitutive grouping a reversing signal at the 50 millisec. interval did not yield many reversed responses. Moreover this view cannot accommodate the finding that for intervals through 120 millisec., relatively few distributions of response amplitude can be accounted for by the summation of instances of response to the first signal alone and to the second signal alone. It is concluded that for these intervals, there were generall either overlapping responses to the two signals or else unitary responses in which the two signals were grouped to produce a combined effect. (Author)
AD-653 977 Not available from CFSTI.

STUDIES WITH RATS I. BRAIN MECHANISM IN FEAR SUPPRESSION. II. COMPLEXITY AND STIMULUS CHOICE. III. ACQUISITION LATENCY AND EXCITATION IN CLASSICAL CONDITIONING.
Final rept., 1 Apr 65-31 Oct 66,
Florida Presbyterian Coll St Petersburg Neuro-Sciences Lab
W. F. Angermeier, Darryl Neill, Al Robbert, Carol Bowden, and Robert Nay. May 67, 49p
6571-ARL-TR-67-12
Contract AF 29 (600)-5135

Descriptors: (*Conditioned reflex, Electrophysiology), Rats, Brain, Stimulation, Fear, Inhibition, Behavior, Learning, Psychophysiology.

Both male and female rats were used to investigate the effects of positive and negative subcortical stimulation on a conditioned escape task. The study utilized (1) non-contingent stimulation and (2) stimulation during extinction. Studies were made to test the 'Theory of Choice' and to investigate horizontal and vertical line preferences in the rat using a simple T-maze. A pilot study was also made in an attempt to furnish some basic data to determine a feasible acquisition criterion in animal escape learning. (Author)
AD-654 006 HC$3.00 MF$0.65

STUDIES OF PILOT PERFORMANCE IN HELICOPTERS.
Ohio State Univ Research Foundation Columbus
For primary bibliographic entry see Field 6S.
AD-654 045 HC$3.00 MF$0.65

PERCEPTION OF SEGMENTS OF VCCV UTTERANCES,
Royal Inst of Tech Stockholm (Sweden) Speech Transmission Lab
For primary bibliographic entry see Field 17B.
AD-654 074 Not available from CFSTI.

OBSERVATIONS OVER THE LIFETIME OF A SMALL ISOLATED GROUP: STRUCTURE, DANGER, BOREDOM AND VISION,
Walter Reed Army Inst of Research Washington D C
William M. Smith. 5 Jul 66, 42p
Availability: Published in Psychological Reports v19 p475-514 1966.

Descriptors: (*Group dynamics, *Confined environments), Social psychology, Behavior, Morale, Visual perception, Antarctic regions, Attitudes, Reaction (Psychology), Sociometrics.
Identifiers: Whiteouts.

Seven men, working as a self-contained unit in Antarctica, were observed from the beginning to the end of their association as a group. Presented and discussed are data on certain properties of informal group structure, effects of personal danger, monotony, boredom, and visual perception in whiteouts. (Author)
AD-654 114 Not available from CFSTI.

INTRA-GROUP COMMUNICATION AND INDUCED CHANGE,
George Washington Univ Alexandria Va Human Resources Research Office
For primary bibliographic entry see Field 5K.
AD-654 124 HC$3.00 MF$0.65

FACTORS INFLUENCING THE VISUAL DETECTION AND RECOGNITION OF LOW-ALTITUDE AIRCRAFT,
George Washington Univ Alexandria Va Human Resources Research Office
A. D. Wright. May 67, 13p Rept no. Professional Paper 20-67
Contract DA-44-188-ARO-2
Prepared for presentation at the Southwestern Psychological Association Meeting, 21-23 April, 1961, in Arlington, Tex.

Descriptors: (*Target recognition, Performance (Human)), Aircraft, Low altitude, Visual perception, Identification, Detection, Flight paths, Binoculars.

A study of man's ability to visually detect, recognize, and estimate range to low-altitude military aircraft is described. Twenty-seven Army enlisted men, who were given training and field experience in detecting and recognizing aircraft, served as observers. Observers were randomly assigned to the nine combinations of observer offset from the aircraft flight path (head-on, 650-, and 1,400-meter offset) and use of binoculars (binoculars for detection and recognition, binoculars for recognition, and no binoculars). Jet and propeller aircraft provided the low-altitude targets. Observers were provided early warning in time and aircraft position prior to each trial. Results of the study are presented. (Author)
AD-654 125 HC$3.00 MF$0.65

PRELIMINARY VALIDITY REPORT OF THE MOS EVALUATION TEST FOR FIELD ARTILLERY CREWMAN MOS CODE 141.6 (13B40),
Army Enlisted Evaluation Center Indianapolis Ind
For primary bibliographic entry see Field 5I.
AD-654 128 HC$3.00 MF$0.65

EGOCENTRIC VISUAL LOCALIZATION IN NORMALS AND PARTIALLY BLIND DURING A CHANGE IN DIRECTION OF GRAVITOINERTIAL FORCE.
Naval Aerospace Medical Inst Pensacola Fla
For primary bibliographic entry see Field 6P.
AD-654 170 HC$3.00 MF$0.65

BRAIN MECHANISMS IN CONDITIONING AND LEARNING.
California Univ., San Diego.
R. B. Livingston. 1966, 116p NASA-CR-84656 Grant NSG-462, Contract NONR/G/-00034-66 (1966) 116 P Refs in Neurosci. Res. Prog. Bull., V. 4, No. 3, 30 Dec. 1966 P 235-347

Descriptors: *Brain, *Learning, *Mammal, Conditioning, Current, Electric, Mechanism, Motivation, Nervous, Reinforcement, Response, Sensory, Signal, System.

For abstract, see STAR 05 15.
N67-28010 HC$3.00 MF$0.65

A NOTE ON THE MODEL MATCHING TECHNIQUE FOR THE MEASUREMENT OF HUMAN OPERATOR DESCRIBING FUNCTIONS.
Royal Aircraft Establishment, Farnborough (England).
J. G. Jones. Dec 65, 24p RAE-TR-65290

Descriptors: *Closed loop system, *Human performance, *Operator performance, Analog, Closed, Control, Function, Human, Loop, Model, Noise, Operator, Performance, System.

For abstract, see STAR 05 15.
N67-28039 HC$3.00 MF$0.65

5K. SOCIOLOGY

KINSHIP AND VOLUNTARY ORGANIZATION IN POST-THERMONUCLEAR ATTACK SOCIETY: SOME EXPLORATORY STUDIES,
Human Sciences Research Inc Mclean Va
Scott A. Greer, and Robert F. Winch. Sep 65, 338p
Rept no. HSR-RR-65/1-Cr
Contract OCD-OS-63-114
Prepared in cooperation with Northwestern Univ., Evanston, Ill., Center for Metropolitan Studies. See also AD-653 468.

Descriptors: (*Sociology, United States), (*Civil defense systems, Sociology), Social psychology, Organizations, Urban areas, Vulnerability, Disasters, Social sciences, Recovery, Statistical data, Reaction (Psychology), Population, Behavior, Survival, Nuclear warfare.
Identifiers: Post attack operations, Families.

The incidence of family-kinship and voluntary organizational patterns in contemporary United States society are examined. Many primary family units, composed of Parents-Immediate Children ('nuclear families'), have ties with relatives outside the nuclear family, which suggests the existence of patterns of extended familism and of kinship networks. Participation in voluntary organizations is a widely pervasive feature of American society, offering a major level and focus of community organization and action. Participation in both kinship relations and voluntary organizations was found to vary on several dimensions. Kinship relations vary most strongly by 'ethnicity'--measured by the religious, cultural, and/or racial background of the family. Differences in patterns of kinship and voluntary organization tend to be associated with differences among social areas which can be described within the physical space formed by metropolitan communities. Several propositions are formed, relating mass data for American cities and the associational networks of localities. (1) There are constant relationships between sub-population types and participation in the local area as a community. The latter increases with declining urbanism. (2) Participation in all forms of voluntary organizations and formal organizations increases with social rank, all other things being equal. (3) Kinship relations vary most sharply by a third dimension of the social area grid: ethnicity. (4) These rank orders hold for gross differences within given cities. (Author)
AD-653 466 HC$3.00 MF$0.65

VULNERABILITIES OF SOCIAL STRUCTURE: STUDIES OF THE SOCIAL DIMENSIONS OF NUCLEAR ATTACK,
Human Sciences Research Inc Mclean Va
David M. Heer, Neil J. Smelser, Howard R. Swearer, S. D. Vestermark, Jr., and Sidney G. Winter, Jr. Dec 66, 764p Rept no. HSR-RR-66/21-Cr
Contract OCD-OS-63-114
See also AD-653 466.

Descriptors: (*Nuclear warfare, *Sociology), (*Civil defense systems, Sociology), Social psychology, Reaction (Psychology), Emotions, Urban areas, Vulnerability, Population, Behavior, Fallout shelters, Recovery, Survival, Disasters, Political science, Economics, United States Government, Statistical data.
Identifiers: Post attack operations.

Possible patterns of social effects and societal vulnerabilities which would result from nuclear attack on the United States are surveyed through analyses of the social sciences. The analyses are centered on the various ways in which social structure and social institutions may be considered to be vulnerable to nuclear attack. A monograph is presented on the general problems of societal analysis posed by attempts to study the vulnerabilities of social structure to nuclear attack. The central theme is that levels of behavioral ordering beyond the individual -- particularly social institutional and social organizational processes -- set the dimensions for the social effects of attack. Five essays report on particular domains of social effects which may result from nuclear attack and on particular methodological problems which must be solved in the study of social effects. Topics considered include individual-human and social psychological dimensions of nuclear attack, demographic effects and population recovery problems, economic recovery after nuclear war, political-administrative dimensions of nuclear attack, and the use of especially the comparative method of social analysis as a tool for developing knowledge about societal vulnerability. A number of ways are traced in which the social dimensions and domains of nuclear attack indicate problems for planners and administrators. The fundamental problem of social planning to reduce societal vulnerability is to understand and control the unfolding of what can be conceived as characteristic, time-dependent, sequentially ordered progressions of social attack effects. (Author)
AD-653 468 HC$3.00 MF$0.65

METHODOLOGY OF SOCIETAL STUDIES,
Rand Corp Santa Monica Calif
Olaf Helmer. Jun 67, 6p Rept no. P-3611

Descriptors: (*Sociometrics, Operations research), Mathematical analysis, Cost effectiveness, Cybernetics, Mathematical models, Simulation, Game theory, Analysis.

It is suggested that future societal studies utilize interdisciplinary collaboration, operations-research techniques, and a systems approach. Techniques may be utilized from the following disciplines: mathematics, conceptual analysis, cybernetics, model building, simulation, organization theory, and analysis of the future.
AD-653 520 HC$3.00 MF$0.65

CONFERENCE ON CLUSTER ANALYSIS OF MULTIVARIATE DATA, NEW ORLEANS, LA., DECEMBER 9, 10 AND 11.
Catholic Univ of America Washington D C
For primary bibliographic entry see Field 5J.
AD-653 722 HC$3.00 MF$0.65

SCUBA DIVING-BIOLOGIC AND PHYSICAL ASPECTS.
School of Aerospace Medicine Brooks AFB Tex
For primary bibliographic entry see Field 6N.
AD-653 945 HC$3.00 MF$0.65

PUBLICATIONS OF THE SOCIAL SCIENCE DEPARTMENT, THE RAND CORPORATION, 1948-1967,
Rand Corp Santa Monica Calif
Ian C. C. Graham, and Eleanor Breese. May 67, 99p Rept no. RM-3600-4

Descriptors: (*Bibliographies, *Social sciences), Political science, USSR, Communism, Indexes.

This Memorandum contains a bibliography of unclassified books, Reports (R's), RAND Memoranda (RM's), Papers (P's), and Translations (T's) that have been issued by (or, in the case of books, published for) the Social Science Department of The RAND Corporation from its inception to April 30, 1967. It replaces RM-3600-3 (AD-631 594) issued in April 1966. RAND publications in the social sciences are listed under authors' names arranged alphabetically. Through the numerical finding lists it is also possible to locate quickly in the author index any item whose number is known. For convenience, a consolidated list of books in the social sciences is provided. (Author)
AD-653 959 HC$3.00 MF$0.65

AREA HANDBOOK FOR THAILAND.
Revised ed.,
American Univ Washington D C Foreign Area Studies Div
George L. Harris, Jackson A. Giddens, Thomas E. Lux, Frederica Muhlenberg Bunge, and Frances Chadwick Rintz. Aug 66, 556p
DA-PAM-550-53
Revision of manuscript submitted 1 Apr 63.
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20202 $2.50 as D101.22:550-53.

Descriptors: (*Thailand, *Handbooks), Social sciences, Political science, Economics, Armed forces (Foreign), Government (Foreign), Culture, Education, Commerce, Labor, Religion, Geography.

The handbook is designed to be useful to military and other personnel who need a convenient compilation of basic facts about the social, economic, political, and military institutions and practices of various countries. The emphasis is on objective description of the nation's present society and the kinds of possible or probable change that might be expected in the future. The handbook seeks to present as full and as balanced an integrated exposition as limitations on space and research time permit. It was compiled from information available in openly published material. Extensive bibliographies are provided to permit recourse to other published sources for more detailed information. There has been no attempt to express any specific point of view or to make policy recommendations. (Author)
AD-654 102 MF$0.65

INTRA-GROUP COMMUNICATION AND INDUCED CHANGE,
George Washington Univ Alexandria Va Human Resources Research Office
Arthur H. Niehoff. Jun 67, 13p Rept no. Professional Paper 25-67
Contract DA-44-188-ARO-2
Prepared for presentation at the Annual Meeting of the Society for Applied Anthropology (26th) 4-7 May 1967, Washington, D. C.

Descriptors: (*Social communication, *Group dynamics), Attitudes, Decision making, Effectiveness, Behavior, Motivation, Social psychology, Culture, Leadership.

The paper discusses the major technique that influences the process of introducing socio-economic innovations in local communities of non-industrial countries: the establishment of effective communication. Positive gossip is shown to be an index of efficient information flow, and several case histories are described in which this is the most important factor in a project's success. Other innovation techniques used by change agents to bring about innovations in a local community, as noted in the case histories, include adaptation to local cultural patterns, utilization of local leadership, and utilization of positive motivation. (Author)
AD-654 124 HC$3.00 MF$0.65

THE ARRANGEMENT AND DIMENSIONS OF RURAL SETTLEMENTS OF THE NORTHEAST COASTAL ZONE OF TANGANYIKA, PANGANI DISTRICT.
Illinois Univ Urbana Dept of Geography
For primary bibliographic entry see Field 8F.
AD-654 152 HC$3.00 MF$0.65

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. BIOCHEMISTRY

REACTION SITES OF ROTENONE IN THE RESPIRATORY CHAIN AND IN SOLUBLE DPNH-COENZYME Q REDUCTASE,
California Univ San Francisco Dept of Biochemistry
Douglas J. Horgan, and Thomas P. Singer. 1967, 5p
Contract Nonr-5024 (00), Grant NSF-GB-3762
Prepared in cooperation with Veterans Administration Hospital, San Francisco, Calif.
Availability: Published in Biochemical and Biophysical Research Communications v27 n3 p356-60 1967.

Descriptors: (*Enzyme inhibitors, Chemical reactions), (*Oxidoreductases, Poisons), (*Poisons, Metabolism), Coenzymes, Mitochondria, Stereochemistry, Nucleotides, Tracer studies, Labeled substances.
Identifiers: Rotenone, Molecular conformations, Diphosphopyridine nucleotide.

The experiments reported in this paper offer independent evidence that the reaction site of coenzyme Q homologues and of rotenone are not the same in intact particles and in the soluble reductase. The rationale of these experiments is as follows. It is known that in mitochondria rotenone and barbiturates interrupt electron transport on the substrate side of coenzyme Q, since they inhibit it its reduction but not its reoxidation. (This is true of both endigenous and externally added CoQ). Since, unlike amytal, rotenone is tightly bound to the respiratory chain, (Burgos and Redfearn, 1965) it seemed logical to label submitochondrial particles with C 14 - rotenone and follow the distribution of radioactivity on extraction of the Pharo-Sanadi DPNH-CoQ reductase. If these views are correct and new reaction sites are created for rotenone and CoQ by the extraction procedure, the rotenone should remain bound to the residue obtained on extraction and the flavoprotein in the soluble portion should be fully active, despite the fact that it is extracted from a rotenone-treated particle. As shown in the report, both of the predictions were confirmed experimentally. (Author)
AD-653 422 Not available from CFSTI.

CONSTITUTIONAL AND ENVIRONMENTAL FACTORS RELATED TO SERUM LIPID AND LIPOPROTEIN LEVELS,
Naval Aerospace Medical Inst Pensacola Fla
For primary bibliographic entry see Field 6E.
AD-653 442 HC$3.00 MF$0.65

BIOCHEMICAL PROFILE OF NERVE MEMBRANE.
Annual rept.,
Chile Univ Santiago
Mitzy Canessa-Fischer, Fernando Vargas, Italo Zamudio, Fernando Zambrano, and Marla Cellino. Feb 67, 65p Rept no. 2
AFOSR-67-1337
Grant AF-AFOSR-788-66

Descriptors: (*Nerve cells, *Membranes (Biology)), Transport properties, Electrophysiology, Ions, Cephalopoda, Hydrostatics, Osmosis, In vivo analysis, Adenosine phosphates, Enzymes, Chile.

Giant axons of the Chilean squid were used to study: (a) enzyme systems of isolated membrane fragments as the cation-activated ATPase system and electron transfer reactions; (b) the ability to transport sodium against an electrochemical gradient in perfused giants axons; (c) filtration coefficient of axon membrane as measured by hydrostatic and osmotic methods. Results gave information of the biochemical processes of nerve membranes, which can be studied in vivo, using intracellular perfused axons. However it was not possible to find the conditions to restore simultaneously the active transport of sodium, the bioelectric properties and the operation of the biochemical reactions studied in vitro. Measurements of hydraulic conductivity of nerve membrane by hydrostatic and osmotic methods suggest the presence of heterogeneity in pore distribution in the axon membrane. (Author)
AD-653 613 HC$3.00 MF$0.65

BIOLOGICAL SIGNIFICANCE OF HIGH MOLECULAR WEIGHT POLYPEPTIDES.
Final rept., 1 Jul 63-30 Jun 66,
Weizmann Inst of Science Rehovoth (Israel) Dept of Biophysics
Ephraim Katchalski. 1967, 7p
AFOSR-67-1208
Grants AF-EOAR-59-63, AF-EOAR-73-64

Descriptors: (*Proteins, Biochemistry), (*Amino acids, Biochemistry), (*Enzymes, Solubility), Polymers, Escherichia coli, Growth, Nutrition, Molecular weight, Peptides, Trypsin, Coliphage, Hydrolysis, Colloids, Cells (Biology), Blood coagulation, Nucleic acids, Viruses, Bacteria, Membranes (Biology), Permeability, Tracer studies, Israel.

The following topics were investigated: (a) Preparation and characterization of water-insoluble enzyme derivatives; (b) Artificial membranes with enzyme activity; (c) Use of polyamino acids in the study of cell membranes; (d) Interaction of polyamines with viruses.
AD-653 641 HC$3.00 MF$0.65

THE SUBSTITUTION OF 1-METHYLHYDRAZINE FOR AMMONIA IN THE GLUTAMINE SYNTHETASE SYSTEM,
School of Aerospace Medicine Brooks AFB Tex
James E. Willis. Nov 66, 11p Rept no. SAM-TR-66-270
Presented at the National Meeting of the American Chemical Society (150th), Atlantic City, N. J., Sept. 12-17, 1965.
Availability: Published in Biochemistry v5 n11 p3557-62 1966.

Descriptors: (*Methyl hydrazines, Metabolism), (*Enzymes, Substrates), Ammonia, Substitutes, In vitro analysis, Condensation reactions, Glutamic acid, Phosphates, Chromatographic analysis, Reaction kinetics, Tracer studies, Liquid rocket propellants, Toxicity.
Identifiers: Glutamine synthease.

1-Methylhydrazine was found to serve as a substrate for glutamine synthetase in an in vitro system with enzyme prepared from skeep brain. The release of inorganic phosphate from ATP was taken as an index of 1-methylhydrazine condensation with L-glutamic acid. Under conditions in which 6.08 unmoles of inorganic phosphate were released, a corresponding decrease of 6.10 unmoles of free 1-methylhydrazine occurred. The Michaelis constant determined for 1-methylhydrazine is approximately 100 times larger than that for ammonia. Paper chromatography of deproteinized incubation mixtures revealed a major and a minor ninhydrin positive and hydrazine containing substance in the complete mixture, but absent from boiled enzyme, non-enzyme and zero time controls and absent from controls lacking ATP, sodium L-glutamate, or 1-methylhydrazine. The enzymic products were separated from glutamic acid, glutamine, and 5-glutamyl-methylamide in two solvent systems. A chromatograpic reference material was prepared by condensation of pyrollidone carboxylic acid with 1-methylhydrazine. As in the case of the enzyme product, two ninhydrin positive and hydrazine containing substances were obtained. Experiments with 14C-1-methylhydrazine showed that both the major and minor enzymic product contained radioactivity. (Author)
AD-653 685 Not available from CFSTI.

FATIGUE AND STRESS STUDIES: AN IMPROVED SEMI-AUTOMATED PROCEDURE FOR FLUOROMETRIC DETERMINATION OF PLASMA CATECHOLAMINES,
Civil Aeromedical Inst Oklahoma City Okla
Vincent Florica. Apr 66, 13p
FAA-AM-66-6

Descriptors: (*Amines, Blood chemistry), (*Stress (Physiology), Amines), Adrenal medulla hormones, Epinephrine, Levarterenol, Fluorescence, Automation, Fatigue (Physiology), Aviation medicine.

A semiautomated technique is described for the estimation of total catecholamines in plasma by the trihydroxyindole procedure. The method utilizes conventional alumina-column chromatography for isolation of the amines. Catecholamine oxidation, tautomerization, and fluorescence detection are accomplished by an automated chemical system. Recoveries from plasma of 0.01 and 0.02 micrograms total catecholamines/10-ml sample were 86.4% plus or minus 8.9% (SD) and 85.6% pl s or minus 5.8% (SD), respectively. Total catecholamine level in resting human plasma, determined by the present technique, was 0.89 plus or minus 0.15 (SD) micrograms/l. (Author)
AD-653 748 HC$3.00 MF$0.65

RED BLOOD CELL PRESERVATION.
Final rept.,
Virginia Univ Charlottesville Biochemical Lab
Alfred Chanutin. 30 Jun 67, 57p
Grant DA-MD-49-193-66-G9206

Descriptors: (*Erythrocytes, Preservation), Storage, pH, Adenine, Nucleosides, Adenosine phosphates, Nucleotides, Viability, Phosphates, Anticoagulants, Additives, Collecting methods, Sac-

charide phosphates, Glycolysis.
Identifiers: Inosines, Guanosines, Adenosines.

Bloods collected in ACD-adenine-inorganic phosphate (ACD-AP) preservatives, supplemented with varying amounts of inosine, adenosine and guanosine, were incubated at 37 C for four hours and then stored at 4 C for six weeks. At two week intervals, phosphorylated carbohydrate intermediates of washed red cells were assayed by ion exchange chromatography. The O-day 2,3-diphosphoglycerate concentrations of the ACD-AP bloods were below the normal range and decreased rapidly during storage; in the presence of inosine or adenosine, the initial values were elevated and remained high during the first two weeks before dropping. Following incubation, the O-day values of ATP were markedly increased, and during storage the rate of decrease was dependent on the pH of the blood and the type and amount of supplement. The red cells of blood collected in the ACD-AP (pH 6.5) preservative maintained the ATP concentrations within the normal range after six weeks storage as effectively as bloods collected in preservatives supplemented with inosine, adenosine or guanosine. After a small initial increase, the ADP levels remained fairly constant. The AMP values increased as the ATP decreased and in most cases, the total adenylate concentration remained fairly constant throughout the storage period. The changes in other phosphorylated compounds were negligible. (Author)
AD-653 796 HC$3.00 MF$0.65

INFLUENCE OF STORAGE IN ACD-ADENINE ON THE METABOLIC INTERMEDIATES OF HUMAN ERYTHROCYTES.
Progress rept., 1 May 66-30 Apr 67,
Laboratory for Comparative Biochemistry La Jolla Calif
Grant R. Bartlett. 29 Mar 67, 27p
Grant DA-MD-49-193-67-G9226

Descriptors: (*Erythrocytes, Preservation), Anticoagulants, Metabolism, Phosphates, Adenine, Additives, Glycolysis, Saccharide phosphates, Nucleotides, Adenosine phosphates, Storage, Chromatographic analysis, Viability.

The results of the study of ACD-adenine can be summarized as follows: Ion-exchange chromatographic analyses of the erthyrocyte phosphate compounds were carried out on blood which had been stored in ACD and in ACD-adenine for 0, 2, 4, 6 and 8 weeks. No obvious differences were found between ACD and ACD-adenine in the intermediates of glucose metabolism, nor was there any evidence for the accumulation of any of the components of the pentose shunt in either case. On the other hand, it was confirmed that storage of the blood in ACD-adenine led to a significant elevation of the adenine nucleotides, AMP, ADP and ATP, which was especially striking in the case of ATP late in storage. (Author)
AD-653 838 HC$3.00 MF$0.65

THE ELECTROMAGNETIC ACTIVITY OF PORPHIN DERIVATIVES.
Pennsylvania Univ Philadelphia John Harrison Lab of Chemistry
For primary bibliographic entry see Field 7C.
AD-653 842 HC$3.00 MF$0.65

PRESERVATION OF RED CELLS IN THE FROZEN STATE WITH SUGARS AND MACROMOLECULAR ADDITIVES: MECHANISM OF INJURY OF FREEZING.
Progress rept. no. 62,
John S Sharpe Research Foundation Bryn Mawr Pa
Max M. Strumia. 1 Jun 67, 31p
Contract DA-49-193-MD-2084

Descriptors: (*Erythrocytes, Preservation), Anticoagulants, Freezing, Viability, Storage, Adenine, Tracer studies, Blood transfusions, Adenosine phosphates, Nucleosides.
Identifiers: Inosines.

The storage of ACD blood can be extended to eight weeks if the blood is incubated with adenine-inosine at the end of the storage period, when measure of viability is based on the accepted standard of an average survival of 70% or better of radioactivity of Cr51 tagged erythrocytes 24 hours posttransfusion. Evidence is presented suggesting that the absolute increase in ATP following incubation with adenine-inosine may not per se be solely responsible for the increased viability of erthrocytes. (Author)
AD-653 844 HC$3.00 MF$0.65

THE EFFECT OF RATE OF GLAND FUNCTION ON PAROTID FLUID URIC ACID LEVELS.
Rept. for 1 Sep-30 Nov 66,
School of Aerospace Medicine Brooks AFB Tex
Ira L. Shannon, and Howard H. Chauncey. Apr 67, 12p Rept no. SAM-TR-67-29

Descriptors: (*Saliva, Secretion), Salivary glands, Uric acid, Stimulation, Correlation techniques, Chemical analysis.

Paired parotid fluid samples were collected without exogenous stimulation and at 5 different gustation-induced rates of flow. Enzymatic uric acid analyses were carried out to ascertain which of the collection procedures was least susceptible to the effect of flow rate on uric acid concentration. The comparative value of the unstimulated sample has not been delineated in the present study, but the extremely high concentration of uric acid in this type of fluid is suggestive of glandular alteration and raises questions concerning the validity of its use. For the stimulated samples the correlation coefficient for flow versus uric acid level, $5 = -.852$, was highly significant ($P < .001$). The effect of flow rate on uric acid concentration diminished as flow rate increased. It is suggested that parotid fluid samples for uric acid analysis should be collected at flow rates of 0.7 ml./min. or more. (Author)
AD-653 936 HC$3.00 MF$0.65

MEASUREMENT OF TRACE LEVELS OF DEUTERIUM OXIDE IN BIOLOGIC FLUIDS USING INFRARED SPECTROPHOTOMETRY.
Rept. for Sep-Dec 66
School of Aerospace Medicine Brooks AFB Tex
Marion J. Stansell, Louis Mojica, Jr., and Harry H. Malvin. Apr 67, 20p Rept no. SAM-TR-67-37

Descriptors: (*Heavy water, Microanalysis), (*Body fluids, Tracer studies), Pathology, Saliva, Infrared spectroscopy, Accuracy, Blood serum, Urine.

A method is described for the reliable direct quantitation of trace levels of D2O in biologic fluids without need for sample preprocessing. Experimental data relevant to the assay of D2O in human serum, urine, and parotid fluids are presented. For serum, with triplicate scans, values of precision and of accuracy of plus or minus 3% at the 250 p.p.m. D2O level are obtained. By use of parotid fluid the values are narrowed to plus or minus 2% at the 200 to 250 p.p.m. D2O range. The data also reveal good agreement between serum distillate D2O levels and concentrations calculated for serum aqueous compartments using values for serum water content. Parotid fluid appears to be particularly suitable for biomedical applications due to its ease of collection, constancy of composition, and similarity in behavior to H2O in the region of 3.98 microns. (Author)
AD-653 940 HC$3.00 MF$0.65

PERCEIVED STRESS, PERFORMANCE, PERSONALITY AND BIOCHEMICAL FACTORS IN HUMANS.
Florida Presbyterian Coll St Petersburg Neuro-Sciences Lab
For primary bibliographic entry see Field 5J.
AD-653 973 HC$3.00 MF$0.65

RENAL ACID DEOXYRIBONUCLEASE: OBSERVATIONS ON DISTRIBUTION AND CELL RELATIONSHIP,
Walter Reed Army Inst of Research Washington D C
Seymour Rosen, Mary Coughlan, and Kevin G. Barry. 9 Nov 66, 4p
Availability: Published in Society for Experimental Biology and Medicine v124 p909-12 1967.

Descriptors. (*Kidneys, *Ribonuclease), Freezing, Distribution, Tissues (Biology), Osmosis, Enzymes.

Acid deoxyribonuclease activity was measured in rat kidney tissue divided into the various renal segments: outer cortex (O.C.), inner cortex (I.C.), outer medulla (O.C.), and inner medulla (I.M., papilla). In terms of total activity, the O.C. had the highest enzyme content. The activity of the I.C. was considerably less and the medullary segments had the lowest values. If freeze-thaw procedures were not utilized, all segments except the papilla markedly decreased in enzyme activity. The enzyme values of the cortical segments were increased by lowering the sucrose content of the homogenate media. Those findings suggest that in addition to regional variation of activity, the relationship of acid deoxyribonuclease to the cell is different among the renal segments. (Author)
AD-654 082 Not available from CFSTI.

DETERMINING THE OSMOTIC FRAGILITY OF ERYTHROCYTES; A METHOD ESPECIALLY APPLICABLE TO PEDIATRICS,
Walter Reed Army Medical Center Washington D C
B. J. Fogel, C. E. Shields, L. B. Altstatt, and T. E. Allen. 1967, 5p
Availability: Published in Clinical Pediatrics v6 n4 p247-51 Apr 1967.

Descriptors: (*Erythrocytes, Hemolysis), Osmosis, Diagnosis, Hematology, Blood diseases, Children, Medicine.

The continuous recording of hypotonic hemolysis (osmogram) and the multiple tube osmotic fragility test demonstrated excellent correlation in identification of normal and abnormal erythrocytic fragility. Although both procedures are based on the same principle, the two methods are not entirely comparable. Immersion of a dialysis bag containing a suspension of erythrocytes into a bath of distilled water permits a constant reduction in the saline concentrations and results in the continuous hemolysis of red blood cells. Since the selected wave length (500 millimicrons) minimally absorbs oxyhemoglobin, the photometric measurements are due principally to the scattering effect of intact red blood cells and resultant rate of erythrocytic destruction rather than the hemoglobin concentration. In contrast the multiple tube test simply determines the percentage of hemolysis in various concentrations of saline and does not permit observation of the rate of erythrocytic destruction. The osmogram can be employed as a screening procedure and seems ideally suited for pediatric use. (Author)
AD-654 090 Not available from CFSTI.

EFFECT OF ETHANOL ON ETHYLENE GLYCOL OXIDATION BY MAMMALIAN LIVER ENZYMES,
Georgetown Univ Washington D C School of Medicine
B. Weiss, and G. Coen. 30 Sep 65, 8p
Contract DA-49-193-MD-2349
Prepared in cooperation with Walter Reed Army

Inst. of Research, Washington, D. C.
Availability: Published in Enzym. Biol. Clin. v6 p297-304 1966.

Descriptors: (*Glycols, Toxicity), (*Ethanols, Oxidation), Alcohols, Oxidoreductases, Inhibition, Mammals, Detoxification, Catalase, Liver, Enzymes.

Ethanol inhibits the oxidation of ethylene glycol by horse liver alcohol dehydrogenase, beef liver catalase, and crude rat liver homogenates. The inhibition of alcohol dehydrogenase is of the competitive type, with a K sub I of 1.9 mM at pH 8.0, at which the K sub m for ethylene glycol is 38 mM. Theoretically, the generation of H2O2, a by-product of the oxidation of ethanol by liver homogenates, could increase the oxidation of ethylene glycol via catalase, but this tendency is outweighed by the inhibitory effect of ethanol on this reaction. The results provide a theoretical basis for the use of ethanol in ethylene glycol intoxication in humans. (Author)
AD-654 109 Not available from CFSTI.

THE COENZYME Q REDUCTASE OF DPNH-CYTOCHROME C REDUCTASE,
California Univ San Francisco Medical Center
D. R. Biggs, Joseph Hauber, and Thomas P. Singer. 9 May 67, 6p
Contract Nonr-5024 (00), Grant NSF-GB-5352
Prepared in cooperation with Vetran's Administration Hospital, San Francisco, Calif. Molecular Biology Div. Research supported in part by PHS grant HE-10027.
Availability: Published in Biochemical and Biophysical Research Communications v27 n6 p632-7 1967.

Descriptors: (*Oxidoreductases, Chemical analysis), Coenzymes, Sterochemistry, Nucleotides, Enzyme inhibitors, Chromatographic analysis, Molecular weight, Poisons.
Identifiers: Rotenone, Molecular conformations, Diphosphopyridine nucleotide.

Since DPNH-cytochrome c reductase and DPNH-CoQ reductase are extracted under very similar conditions and since heat-acid-ethanol are responsible for the emergence of both activities, it was of interest to examine the relation of DPNH-CoQ reductase to the cytochrome c reductase of Mahler et al. (1952). The two preparations have already been compared with respect to composition, catalytic activities, and chromatographic behavior and no significant difference was found (Machinist and Singer, 1965 a,b). On the other hand Pharo et al. (1966) and Sanadi et al. (1965) have emphasized that, despite the similarity of the two preparations, only DPNH-CoQ reductase can react with long chain CoQ homologues, while the Mahler enzyme cannot. The recent publication of the assay method used by these workers (Pharo et al., 1966) aided the purported difference between the two flavoproteins. (Author)
AD-654 115 Not available from CFSTI.

QUANTITATIVE STUDIES OF PHYTOHEMAGGLUTININ-INDUCED DNA AND RNA SYNTHESIS IN NORMAL AND AGAMMAGLOBULINEMIC LEUKOCYTES,
Walter Reed Army Inst of Research Washington D C
Douglas C. Tormey, Roberta Komin, and H. Hugh Fudenberg. 1967, 10p
Contract Nonr-3656 (12), Grant PHS-HE-05997
Availability: Published in Journal of Experimental Medicine v125 n5 p863-72 May 1 1967.

Descriptors: (*Nucleic acids, Biosynthesis), (*Leukocytes, Nucleic acids), (*Gamma globulin, Deficiency diseases), Blood diseases, Plants (Botany), Tissue extracts, Agglutinins, In vitro analysis, Labeled substances, Mitosis, Lymphocytes, Genetics, Ribonucleic acids, Desoxyribonucleic acids.

Leukocytes from nine patients with acquired agammaglobulinemia were studied in vitro. Synthesis of deoxyribonucleic acid (DNA) and ribonculeic acid (RNA) induced by phytohemagglutinin was measured by determination of the degree of incorporation of labeled precursor. Synthesis of both DNA and RNA was decreased in the agammaglobulinemic cells. The presence of an inhibitor in the patients' sera could not be demonstrated. These results suggest that the basic defect in agammaglobulinemia is cellular rather than humoral. (Author)
AD-654 117 Not available from CFSTI.

COACERVATES AND ENZYMES PROTEIN-CARBOHYDRATE COACERVATES AND BETA-AMYLASE.
Koatservaty I Fermenty. Belkovo- Uglevonyye Koatservaty I Beta-amilaza
International Information, Inc., Philadelphia, Pa.
M. N. Nestyuk, T. A. Shubert, and T. N. Yevreinova. Jan 67, 8p NASA-TT-F-10685
Contract NASW-1499
Transl. Into English From Dokl. Akad Nauk Sssr (Moscow), V. 105, No. 1, 1955 P 137-140

Descriptors: *Carbohydrate, *Decomposition, *Enzyme activity, *Low molecular weight, Activity, Content, Distribution, Drop, Enzyme, Low, Molecular, Phosphorus, Soybean, Starch, Sugar, Weight.

For abstract, see STAR 05 15.
N67-28223 HC$3.00 MF$0.65

6C. BIOLOGY

EXTRATERRESTRIAL LIFE,
Massachusetts Inst of Tech Lexington Lincoln Lab
W. Boyd Smith. 6 Sep 66, 2p Rept no. JA-2987 ESD-TR-67-263
Contract AF 19 (628)-5167
Availability: Published in Science v155 n3764 p852 Feb 17 1967.

Descriptors: (*Venus (Planet), *Surface temperatures), (*Space biology, Venus (Planet)), Brightness, Thermal properties, Radio transmission, High-temperature research, Theory, Space probes.

It is argued by reference to the literature that the assumption by Horowitz (Science, 18 Feb 66) that the surface temperature of Venus is equivalent to its apparent radio temperature is unjustified. (Author)
AD-653 411 Not available from CFSTI.

MYCOLOGICAL STUDIES OF THE ALASKAN ARCTIC,
Arctic Inst of North America Washington D C
For primary bibliographic entry see Field 6F.
AD-653 415 Not available from CFSTI.

IXODID TICKS (ACARINA, IXODIDAE) OF CENTRAL AFRICA. VOLUME I. GENERAL INTRODUCTION. GENUS AMBLOYOMMA KOCH, 1844,
Maryland Univ College Park Dept of Zoology
Alena Elbl, and George Anastos. 1966, 286p
Contract DA-49-007-MD-981
See also Volume 2, AD-653 535.

Descriptors: (*Ticks, Subsaharan Africa), Classification, Identification, Distribution, Ecology, Morphology (Biology), Disease vectors, Mammals, Reviews, Maps, Tables.

The study consists of three parallel investigations: (1) survey and critical review of the world-wide literature dealing with the ixodid ticks of Central Africa in general and of the Congo, Rwanda and Burundi in particular; (2) examination and identification of available ixodid tick materials previously collected in Central Africa (Congo, Rwanda and Burundi), comprising some 70,000 specimens; and (3) collection and identification of new materials coupled with field and laboratory observations on the biology and ecology of some of the tick species occurring in the Kivu Province of the Congo and in the Republic of Rwanda. Up to the present time, 78 species of ixodid ticks belonging to nine genera have been reported from Central Africa (Congo, Rwanda and Burundi). Of this, the presence of 75 species in this area is validated by available materials and new collections. The geographical distribution, as well as the list of affected hosts vary with each species. Most of these species occur on a variety of domestic and wild animals and are capable of causing severe economic losses to the livestock industry as well as transmitting agents of human diseases. The results of these studies are presented in such a way that each genus is treated as a discrete unit in which each species is dealt with from the viewpoint of taxonomy, distribution and hosts, biology, relationship to disease, diagnosis, description and illustration. The distribution of each of the species in the Congo, Rwanda and Burundi is plotted individually on maps, and keys to the identification of the adults of each species are presented in the treatment of each genus. (Author)
AD-653 534 HC$3.00 MF$0.65

IXODID TICKS (ACARINA, IXODIDAE) OF CENTRAL AFRICA. VOLUME II. GENUS IXODES LATREILLE, 1795,
Maryland Univ College Park Dept of Zoology
Alena Elbl, and George Anastos. 1966, 212p
Contract DA-49-007-MD-981
See also Volume 1, AD-653 534 and Volume 3, AD-653 536.

Descriptors: (*Ticks, Subsaharan Africa), Classification, Identification, Distribution, Ecology, Morphology (Biology), Disease vectors, Mammals, Maps, Tables.

For abstract, see AD-653 534.
AD-653 535 HC$3.00 MF$0.65

IXODID TICKS (ACARINA, IXODIDAE) OF CENTRAL AFRICA. VOLUME III. GENUS RHIPICEPHALUS KOCK, 1844,
Maryland Univ College Park Dept of Zoology
Alena Elbl, and George Anastos. 1966, 562p
Contract DA-49-007-MD-981
See also Volume 2, AD-653 535 and Volume 4, AD-653 537.

Descriptors: (*Ticks, Subsaharan Africa), Classification, Identification, Distribution, Ecology, Morphology (Biology), Disease vectors, Mammals, Maps, Tables.

For abstract, see AD-653 534.
AD-653 536 HC$3.00 MF$0.65

IXODID TICKS (ACARINA, IXODIDAE) OF CENTRAL AFRICA. VOLUME IV. GENERA APONOMMA NEUMANN, 1899, BOOPHILUS CURTICE, 1891, DERMACENTOR KOCH, 1844, HAEMAPHYSALIS KOCK, 1844, HYALOMMA KOCH, 1844 AND RHIPICENTOR NUTTALL AND WARBURTON, 1908. LISTS AND BIBLIGRAPHY,
Maryland Univ College Park Dept of Zoology
Alena Elbl, and George Anastos. 1966, 413p
Contract DA-49-007-MD-981
See also Volume 3, AD-653 536.

Descriptors: (*Ticks, Subsaharan Africa), Classification, Identification, Distribution, Ecology, Morphology (Biology), Disease vectors, Mammals, Maps, Tables, Bibliographies.

For abstract, see AD-653 534.
AD-653 537 HC$3.00 MF$0.65

JUNGLE ACOUSTICS II: LOCALIZATION OF SOUNDS IN THE JUNGLE.
Army Tropic Test Center Fort Clayton Canal Zone
For primary bibliographic entry see Field 20A.
AD-653 619 HC$3.00 MF$0.65

HOST-PARASITE RELATIONS IN SOME PENTASTOMIDA,
Naval Medical Research Unit No 2 Taipei (Taiwan)
J. Teague Self, and Robert E. Kuntz. 18 Jul 66, 10p Rept no. NAMRU-2-TR-270
NAVMED-MR005.20-0098.43
Availability: Published in Journal of Parasitology, v53 n1 p202-6 1 Feb 1967.

Descriptors: (*Reptiles, Parasitic diseases), (*Parasites, *Arthropods), Life cycle, Morphology (Biology), Respiratory system, Mammals, Pathology, Tissues (Biology), Worms, Taiwan.

Pentastomida generally considered to reach adulthood in the respiratory systems of reptiles may attain precocious development in some of these definitive hosts. Sexually mature Kiricephalus pattoni and Porocephalus crotali have been recovered from serous cavities and tissues. In tissue dwelling forms there is evidence that contacts may be maintained with the atmosphere through integumentary rents. In natural mammalian and reptilian hosts tissue dwelling pentastomes elicit little, if any, pathological tissue response, while in human tissues the response may be highly inflammatory. (Author)
AD-653 804 Not available from CFSTI.

REVISION OF THE PORRORCHINAE (ACANTHOCEPHALA: PLAGIORHYNCHIDAE) WITH DESCRIPTIONS OF TWO NEW GENERA AND THREE NEW SPECIES,
Naval Medical Research Unit No 2 Taipei (Taiwan)
Gerald D. Schmidt, and Robert E. Kuntz. 27 Jun 66, 17p Rept no. NAMRU-2-TR-269
NAVMED-MR005.20-0098.42
Availability: Published in Journal of Parasitology, v53 n1 p130-41 1 Feb 1967.

Descriptors: (*Parasites, Classification), Worms, Morphology (Biology), Birds, Reptiles, Amphibians, Mammals, Taiwan.

The acanthocephalan subfamily Porrorchinae is revised. Pseudoporrorchis Joyeux and Baer, 1935 is synonymized with Porrorchis Fukui, 1929. A report is made on Acanthocephala of this subfamily from birds, amphibians, reptiles, and mammals from Taiwan, North Borneo, and Palawan (Philippines) including descriptions of Porrorchis hylae (Johnston, 1914) comb. n.; P. elongatus Fukui, 1929; P. leibyi sp.n.; Owilfordia olseni gen. et sp. n.; and Pseudolueheia pittae gen. et sp. n.; Pseudoporrorchis teliger Van Cleave, 1949 is placed in Owilfordia gen. n., and Lueheia boreotis Van Cleave and Williams, 1951 is placed in Pseudolueheia gen. n. A revised scheme of classification is presented. (Author)
AD-653 805 Not available from CFSTI.

NATURAL RESISTANCE OF WOODS TO BIOLOGICAL DETERIORATION IN TROPICAL ENVIRONMENTS. PART I. SCREENING TESTS OF A LARGE NUMBER OF WOOD SPECIES.
Naval Research Lab Washington D C
For primary bibliographic entry see Field 11L.
AD-653 856 HC$3.00 MF$0.65

OPTOMOTOR REACTION, LOCOMOTORY BIAS, AND REACTIVE INHIBITION IN THE MILKWEED BUG ONCOPELTUS AND THE BEETLE ZOPHOBAS.
Final rept.,
Stanford Research Inst Menlo Park Calif
Donald M. Wilson, and Ronald R. Hoy. Jun 67, 31p
AFOSR-67-1344
Contract AF 49 (638)-1453

Descriptors: (*Insects, Motor reactions), Motion, Behavior, Inhibition, Coleoptera, Proprioception, Responses, Larvae, Adults, Sensory perception, Nervous system.

Reactive inhibition in a locomotory turn choice situation in the milkweed bug Oncopeltus fasciatus is shown probably to be no more than the delayed optomotor reaction which follows an induced turn. The two reactions have similar time constants of decay. Neither reaction occurs in infrared light or in blinded specimens of Oncopeltus. In two situations of open-loop optomotor feedback conditions, individual Oncopeltus often show strong turning biases. In infrared light they may walk in circles. In ordinary light on the Y maze globe they make significantly long runs of turns in a single direction. When freed in ordinary light, the same individuals do not exhibit the bias. Apparently, the optomotor reaction can correct this central error. The larvae of the beetle Zophobas rugipes do not exhibit an optomotor response. They do show a strong reactive inhibition which must therefore depend upon some other input modality. Adults of Zophobas do have an optomotor reaction, but they show reactive inhibition in turn choices even in infrared light. Locomotory reactive inhibition depends upon different input modalities in different species of insects. (Author)
AD-653 982 HC$3.00 MF$0.65

STUDIES OF THE MOSQUITOES OF THE INDONESIAN-PAPUAN AREA.
Final technical rept., 1 Jun 64-31 May 67,
Bernice P Bishop Museum Honolulu Hawaii
J. L. Gressitt. 31 May 67, 6p
Contract DA-49-193-MD-2601

Descriptors: (*Culicidae, Southeast Asia), Distribution, Collecting methods, New Guinea, Indonesia, Life cycle, Ecology.

During this period, four major expeditions to the Australian Territory of Papua and New Guinea were conducted. These expeditions resulted in the accumulation of a very large collection of mosquitoes, including adults, pupae, larvae and link-bred series. Approximately 75,000 specimens (including all stages) were collected from the Australian Territory of Papua and New Guinea and about 40,000 from Indonesia (mostly from Ambon Island in the Moluccas). Most of the material has been processed and is being worked on by specialists. Valuable ecological data was obtained and recorded on standard collection data cards. (Author)
AD-654 135 HC$3.00 MF$0.65

LABORATORY ANIMAL SCIENCE. A REVIEW OF THE LITERATURE FOR APRIL-JUNE 1966. ABSTRACTS 124-468, ISSUE 2,
Argonne National Lab., Ill.
Robert J. Flynn. Nov 66, 134p
Contract W-31-109-eng-38

Descriptors: (*Laboratory animals, Bibliographies), (*Medical research, *Biological laboratories), Nutrition, Genetics, Pathology, Environment.

For abstract, see NSA 21 13.
ANL-7300 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
Barbara G. Russell. 28 Feb 67, 43p
Contract AT (45-1)-1830

Descriptors: (*Plutonium, Abstracts), Biology, Chemistry, Medicine, Metallurgy, Ceramic materials, Health physics, Safety, Nuclear engineering, Physics.

For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

IDENTIFICATION OF DESTRUCTIVE ALASKA FOREST INSECTS,
Pacific Northwest Forest and Range Experiment Station, Juneau, Alaska. Inst. of Northern Forestry.
J. S. Hard. 1967, 21p

Descriptors: (*Insects, *Entomology), (*Forestry, *Alaska), Trees, Population, Damage, Protection, Plants (Botany), Identification, Control, Life cycle, Collecting methods, Larvae, Weather, Pest control, Mortality rates, Sampling.

Insects are an integral part of the forest, but only a relatively few kinds are capable of severely damaging Alaska's forests. Noticeable damage is usually accompanied by a great increase in an insect population. The outbreak or epidemic may last for one or more years and move from one forest area to another causing damage to trees on millions of acres before it subsides. The population collapse is usually quicker than its eruption. The biotic and physical factors responsible for population increase and subsidence are not well known for Alaska's destructive forest insects. Forest insect presence and population increases are frequently first detected by the characteristic damage symptoms on host trees. This guide uses these characteristic damage symptoms to identify the causal insects. The guide does not contain information for controlling forest insect pests. (Author)
PB-174 834 HC$3.00 MF$0.65

COMANDRA, GRAZING, AND COMANDRA BLISTER RUST.
Intermountain Forest and Range Experiment Station, Ogden, Utah.
For primary bibliographic entry see Field 2F.
PB-174 847 HC$3.00 MF$0.65

SURVEY OF THE RESPONSES OF RAT-LIVER MITOCHONDRIA TO SIMPLE METAL CATIONS,
California Univ., Livermore. Lawrence Radiation Lab.
Robert Grabske. 29 Dec 66, 20p
Contract W-7405-eng-48

Descriptors: (*Mitochondria, *Biological laboratories), Metals, Ions, Interactions, Rats, Liver, In vitro analysis, Stimulation, Inhibition.

For abstract, see NSA 21 13.
UCRL-50168 HC$3.00 MF$0.65

6D. BIONICS

COMPUTING, THINKING, AND DYNAMICS,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 9B.
AD-653 446 HC$3.00 MF$0.65

BIONICS RESEARCH.
Foreign Technology Div Wright-Patterson AFB Ohio
20 Dec 66, 148p Rept no. FTD-HT-66-601
TT-67-62096
Unedited rough draft trans. of mono Issledovaniya po Bionike: Respublikanskii Mekhvedomstvennyi Sbornik, Kiev, 1965 115p.

Group 6D — Bionics

Descriptors: (*Bionics, Scientific research), Biology, Anatomy, Morphology (Biology), Aquatic animals, Biophysics, Mechanics, Bone, Nervous system, Mathematical models, Nucleic acids, Neuromuscular transmission, USSR.

Contents: Hydrodynamic characteristics of the movement of certain aquatic animals; Speed of whales and certain characteristics of their external structure; Creation of vertical transverse forces by the bodies of nektonic animals; Streamlining characteristics in calamaries; Certain mechanical properties of the tubular bones of animals; Certain physiochemical and mechanical properties of the synovia and its role in the mechanism of the extremital joints; Morphofunctional analysis of the brachial muscles of certain ungulates; A mathematical model of the excitation of nerve tissue; Investigation of the properties of a mathematical model of the excitation of nerve tissue with a continuous-action computer; Electric modeling of bond oscillations in nucleic acid and determination of nucleotide sequence; A frequency method for investigating information transmission through the cerebral synapses; One method of recognizing a limited set of words.
AD-653 507 HC$3.00 MF$0.65

RESEARCH ON THE ANALOGICAL SIMULATION OF NEURAL BEHAVIOR.
Final rept., 14 Apr 63-15 Apr 67,
General Precision Inc Glendale Calif Librascope Div
Edwin R. Lewis. 15 Apr 67, 42p
AFOSR-67-1313
Contract AF 49 (638)-1232

Descriptors: (*Bionics, *Nerve cells), Analog systems, Models (Simulations), Electrophysiology, Membranes (Biology), Electrical conductance, Neurology.

The Hodgkin-Huxley descriptions of electrically excitable conductances are combined with the Eccles descriptions of synaptic conductances to provide the basis of an electronic analog of nerve-cell membrane. Studies with this analog reveal that the system of synaptic and electrically excitable conductances can easily be extended to account for many forms of neuronal behavior previously unexplained, including the following: facilitation, antifacilitation and various forms of after effects in response to synaptic inputs; the three basic forms of spontaneous neuronal potentials (sinusoidal, sawtoothed and spikes); and nonperiodic spike generation, such as the productions of spike pairs and multimodal spike-interval histograms. In addition, the analogs are used to explore interactions of spatially distributed neuronal processes including the effects of coupling an integrative region (such as a soma) to a spike-initiator region (such as an axon Hillock), and the propagation of potentials along an axon. Among other things, these studies reveal mechanisms for resetting of the soma potential by invading spikes as well as many interesting phenomena associated with nonuniform conduction of voltage waveforms along an axon. Finally, the analogs are used to study the consequences of simple connections between two neurons. The significant results include the prediction of spike-burst formation in a mutually exciting pair of neurons, and the possibility of stable synchrony in a pair of independently driven mutually inhibiting neurons. (Author)
AD-653 614 HC$3.00 MF$0.65

NEURONAL OSCILLATORS,
Imperial Coll of Science and Technology London (England) Dept of Electrical Engineering
Jack D. Cowan. Jan 67, 32p
Revised version of a lecture given at the Norbert Wiener Memorial Meeting on the Idea of Control, Genos (Italy), Oct 65.

Descriptors: (*Nervous system, *Bionics), Mathematical models, Neurology, Physiology, Nerve cells, Brain, Electrophysiology, Information theory, Nerve impulses, Models (Simulations), Great Britain.

In order to identify the functional units of the nervous system a 'channel' from neurophysiology to behaviour must be found. It is contended that such a channel is to be found in the study of neurodynamics, 'the shifting harmony of subpatterns', using precise mathematical models based firmly on experimental data. (Author)
AD-653 893 HC$3.00 MF$0.65

SOVIET CYBERNETICS: RECENT NEWS ITEMS NO. 5,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 9B.
AD-653 937 HC$3.00 MF$0.65

6E. CLINICAL MEDICINE

SEMIANNUAL REPORT TO THE ATOMIC ENERGY COMMISSION,
Argonne Cancer Research Hospital, Chicago, Ill.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 13.
ACRH-26 HC$3.00 MF$0.65

CONSTITUTIONAL AND ENVIRONMENTAL FACTORS RELATED TO SERUM LIPID AND LIPOPROTEIN LEVELS,
Naval Aerospace Medical Inst Pensacola Fla
William R. Harlan, Jr., Albert Oberman, Robert E. Mitchell, Ashton Graybiel, and Robert J. Wherry, Jr. 2 Mar 67, 31p Rept no. NAMI-1000
NAVMED-MF022.03.02-5007
Contract NASA Order R-136

Descriptors: (*Cardiovascular diseases, Etiology), (*Lipids, Cardiovascular diseases), (*Lipoproteins, Cardiovascular diseases), Cholesterol, Obesity, Carbohydrates, Tolerances (Physiology), Tobacco, Personality, Environment, Blood chemistry, Genetics, Obesity, Metabolism, Diet.

Serum lipoproteins and lipids were measured in 657 men (age 48) and were correlated with multiple constitutional and environmental variables. The two lipoprotein groups, Sf 0-12 and Sf 20-400, had a low intercorrelation and each correlated with different factors. The Sf 0-12 lipoproteins were related to constitutional obesity, cigarette smoking, and family history of vascular disease. The Sf 20-100 and Sf 100-400 lipoproteins were related to acquired obesity, carbohydrate tolerance, and 'aggressiveness' and 'sociability' as determined by personality survey. Carbohydrate tolerance, obesity, and personality were apparently independent variables. Serum triglyceride levels correlated with the same variables as the Sf 20-400 lipoproteins; serum cholesterol levels were related to factors that correlated with both lipoprotein groups. High levels (above 90th percentile) of each lipoprotein fraction and each lipid were associated with significantly greater quantities of the variables found to be correlated with each lipid fraction. The prevalence of familial hyperlipidemias was low (approximately 3-4%), but 18 per cent of individuals with elevated cholesterol and a high risk of coronary heart disease could be tentatively classified as having a type of familial hyperlipidemia. (Author)
AD-653 442 HC$3.00 MF$0.65

ACQUIRED HEART DISEASE IN UGANDAN CHILDREN,
Makerere Medical Coll Kampala (Uganda)
Joan L. Caddell, A. Warley, D. H. Connor, P. G. D'Arbela, and J. R. Billinghurst. 29 Dec 65, 8p
Grant DA-MD-49-193-63-G101
Availability: Published in British Heart Journal v28 n6 p759-65 Nov 1966.

Descriptors: (*Cardiovascular diseases, Children), Africa, Heart, Diseases, Etiology, Electrolytes (Physiology), Nutrition, Anemias, Kidneys, Diagnosis, Heart, Rheumatic diseases, Public health, Antibiotics.

Acquired heart disease is a major paediatric problem of the tropics and subtropics. Excluding the commonest aetiological factors that may lead to heart disease in children--severe electrolyte imbalance, protein-calorie malnutrition, anaemia, and acute nephritis, 50 instances of acquired cardiac disorders were seen in a one-year period in African children in Kampala, Uganda. Although the exact diagnosis was not made clinically in many of the patients with chronic carditis, it was established beyond question that the most prominent aetiological factor was rheumatic fever, which was diagnosed in 23 of the 50 patients, suspected in 5 who had both mitral insufficiency and mitral stenosis, and might also have been the aetiological factor in some of those with pure mitral insufficiency. This was an unexpected finding, since most of the published cardiology reports from Uganda have emphasized endomyocardial fibrosis. The aetiology of endomyocardial fibrosis is not known, but correction of the potassium and magnesium deficiency that commonly occur during prolonged gastroenteritis among children of the lowest income group in the tropics might help to protect the heart from scarring. The prevention of initial and recurrent episodes of rheumatic fever requires an increase in health education, clinic facilities, and adequate supplies of penicillin and the sulphonamides. (Author)
AD-653 493 Not available from CFSTI.

PATHOLOGY OF OXYGEN TOXICITY IN FORTY MACACA MULATTA.
Final rept., May 65-Apr 66
Aerospace Medical Research Labs Wright-Patterson AFB Ohio
Farrel R. Robinson, David T. Harper, Harold P. Kaplan, and Anthony A. Thomas. Mar 67, 23p
Rept no. AMRL-TR-66-234

Descriptors: (*Lungs, Pathology), (*Oxygen, Toxicity), Pathology, Monkeys, Pressure breathing, Mortality rates, Responses, Respiratory system, Biopsy, Recovery.

Forty monkeys (Macaca mulatta) were exposed to 99-100% oxygen at pressures from 600 to 760 mm Hg. The acute exudative pulmonary response was seen in only three exposed at 760 mm Hg. The subacute proliferative pulmonary response was seen at all levels studied, the degree being directly related to time-dose exposures. In the high dose ranges clinical signs of illness were evident after 5-7 days exposure when the monkeys became listless and anoretic. By 14 days they were quite lethargic and had assumed a huddled position. Grossly, the heavy lungs had a gray, bloodless appearance. Microscopically, there was extreme proliferation of the interstitium and alveolar epithelium. None of the monkeys that were exposed at 600 mm Hg died, although mild focal proliferative changes were seen. After 31 days postexposure, these changes appeared as focal areas of atelectasis with mild septal fibrosis. (Author)
AD-653 526 HC$3.00 MF$0.65

REVIEW OF CLINICAL AND EXPERIMENTAL STUDIES IN CONDITIONAL REFLEXES, PSYCHO AND NEUROPHYSIOLOGY IN U.S.S.R., CZECHOSLOVAKIA AND GREAT BRITAIN JUNE 1966 - SEPTEMBER 1966,
Duke Univ Durham N C Medical Center
For primary bibliographic entry see Field 6P.
AD-653 594 HC$3.00 MF$0.65

EXISTENCE OF AN APPARENT METABOLIC BLOCK IN HUMAN GRANULATION TISSUE,
Texas Univ Galveston Medical School
Takayashi Hayashi, Truman G. Blocker, Jr., and

Wiktor W. Nowinski. 30 Sep 65, 5p
Contract Nonr-1598 (05)
Availability: Published in Journal of Surgical Research Clinical and Lab. Investigation v6 n8 p327-30 Aug 1966.

Descriptors: (*Wounds + injuries, Healing), Metabolism, Burns, Tissues (Biology), Oxygen consumption, Saccharide phosphates, Infections, Histology, Chemotherapy, Enzymes.

The existence of an apparent metabolic block in the Embden-Meyerhof pathway, found at the height of phosphofructokinase in rabbit granulation tissue, was confirmed also in human granulation tissue obtained from severely burned patients. Unlike the case with experimental animals, the block persists in man even in 90-day-old tissue. Infection and medication are discussed as some of the possible factors involved in this discrepancy. (Author)
AD-653 687 Not available from CFSTI.

QUANTITATIVE STUDIES OF THE MICROCIRCULATION IN SHOCK.
Progress rept., 1 Jul 66-15 Feb 67,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
B. W. Zweifach, and Marcos Intaglietta. 23 Feb 67, 4p
Contract DADA17-67-C-0001

Descriptors: (*Shock (Pathology), *Blood circulation), Hemorrhage, Capillaries, Blood pressure, Osmotic pressure, Viscosity, Measurement, Recording systems, Permeability, Colloids.

Studies on hemorrhagic shock in the rat and rabbit were directed towards establishment of quantitative indicies of transport and exchange efficiency at the level of the blood capillaries. An updated version of the Landis micro-occlusion technique was used to calculate the rate of fluid movement across single capillaries in the mesentery and thereby filtration constants for arterioles, capillaries and venules. Micro-pressure transducers were designed to measure the distribution of capillary pressures throughout the microcirculatory apparatus and to record arteri l-venous pressure differentials relative to flow rates recorded by motion pictures. The colloid osmotic pressure of blood plasma samples taken during the progression of the shock syndrome was measured by a newly adapted high speed osmometer. The above parameters should make it possible to separate the contribution of the physiological state of the vessel barrier from those of alterations in the physical properties of the blood per se in the light of the impairment of tissue nutrition which develops in severe shock. Furthermore, quantitative data of this kind will permit careful evaluation of therapeutic procedures and plasma expanders on the progression of the circulatory insufficiency. (Author)
AD-653 798 HC$3.00 MF$0.65

INVESTIGATION OF INTRAVENOUS FAT EMULSIONS.
Final rept., Jul 57-Oct 66,
Louisiana State Univ New Orleans Dept of Surgery
Isidore Cohn, Jr. Oct 66, 26p
Contract DA-49-007-MD-879
See also AD-233 668.

Descriptors: (*Fats, Parenteral infusions), (*Colloids, Fats), Lipids, Toxicity, Blood pressure, Toxic tolerances, Tables, Dogs.

Extensive work was conducted in studying the effects of a single infusion and of the long-term administration of various commercial, experimental and laboratory emulsions to normal dogs. On the basis of the animal toxicity studies a number of satisfactory and promising i.v. fat emulsions were found. (Author)
AD-653 839 HC$3.00 MF$0.65

NOVEL IMAGE-DISSECTOR CAMERA-TUBE FOR SURVEILLANCE APPLICATION INVESTIGATION.
Final rept., 1 Jul 64-30 Jun 66,
Westinghouse Electric Corp Elmira N Y Electronic Tube Div
R. R. Beyer, R. K. Ainey, H. Anderton, and K. F. Boll. Feb 67, 79p
ECOM-00180-F
Contract DA-28-043-AMC-00180 (E)
See also AD-472 720.

Descriptors: (*Camera tubes, *Combat surveillance), (*Lasers, Optical scanning), Image tubes, Optical tracking, Optical images, Scanning, Deflection, Ranges (Distance).

An image-dissector has been built with an electrostatically variable aperture. This device gives a 5-to-1 change in resolution with a corresponding improvement in signal-to-noise ratio at low light-levels. A prototype night-surveillance system which could incorporate this device has also been constructed. The system incorporates an image-dissector which is scanned synchronously with a laser beam. It is shown that the ranging distance and accuracy is mainly limited by the laser power and the oscillating-mirror system used to scan the laser beam. The range-gate achieved was about 250 yards up to a distance of 600 yards. (Author)
AD-653 855 HC$3.00 MF$0.65

LOSS OF VISION FROM HIGH INTENSITY LIGHT.
Conference proceedings.
Advisory Group for Aerospace Research and Development Paris (France)
1966, 193p Rept no. AGARD-CP-11
NATO Furnished. A symposium sponsored by the Aerospace Medical Panel of AGARD-NATO, held in Paris (France), 16-17 Mar 66.

Descriptors: (*Flashblindness, Symposia), Vision, Retina, Burns, Thresholds (Physiology), Light, Intensity, Lasers, Blood vessels, Hazards, Nuclear explosions, Eye, Flight crews, Selection, Visual acuity, Photochromism, Neuromuscular transmission, France.

Contents: Visual decrement in humans following thermonuclear detonations; Functional damage threshold for retinal burn; Visual and retinal effects of exposure to high intensity light sources; Immediate and delayed retinal vascular changes following exposure to high intensity light; Effects of laser irradiation on head and eye of small animals in terms of neuro-motor behavior; The time course of flash-blindness; Effects of simulated retinal burns on detectability and legibility; Preserving vision despite exposure to high intensity light; Success of US Navy equipment development programs in meeting the flash-blindness problem; Photochromic substances; Relative danger of retinal burn and flash-blindness for various yields of nuclear explosions; Prediction of eye safe separation distances; Resistance to flash-blindness and aircrew selection.
AD-653 917 HC$3.00 MF$0.65

EFFECT OF INTRARECTAL DEXAMETHASONE ON SERUM FREE 17-OHCS LEVELS.
Rept. for 15 May-15 Jun 66,
School of Aerospace Medicine Brooks AFB Tex
Marshall Sparberg, Robert L. Jenson, Steven C. Beering, and Ira L. Shannon. Apr 67, 9p Rept no. SAM-TR-34

Descriptors: (*Corticosteroid agents, Chemotherapy), Pituitary gland, Adrenal glands, Inhibition, Dosage, Diurnal variations, Pharmacology, Adrenocorticotropic hormone.
Identifiers: Enemas, Dexamethasone.

The small-volume, water-soluble corticosteroid enema is valuable in treating ulcerative proctitis and mild ulcerative colitis. Approximately one-third of the dose is absorbed into the systemic circulation, an amount sufficient to produce pituitary-adrenal suppression. Dexamethasone (1 mg.) orally or dexamethasone-21-phosphate (2 mg.) administered in 45 ml. of warm tap water as a retention enema to healthy volunteers at 8:00 a.m. produced highly significant depression of the 3:00 p.m. serum 17-hydroxy-corticosteroids compared to controls ($P < .01$). Interpolation of these acute results to the long-term administration of soluble corticosteroid enemas would suggest that chronic pituitary-adrenal suppression may occur after discontinuation of therapy. (Author)
AD-653 941 HC$3.00 MF$0.65

COMPARATIVE STUDY OF ALLERGIC REACTIONS IN MONKEYS TO P.P.D. AND KOCH'S OLD TUBERCULIN.
Technical translation,
School of Aerospace Medicine Brooks AFB Tex
M. A. Linnikova. 1967, 9p Rept no. SAM-TT-R-759-0067
TT-67-62144
Sravnitelnoe Izuchenie Allergicheskikh Reaktsii na Ochishchennyi Protein-Derivat Tuberkulina i Alttuberkulin Kokha v Opytakh na Obezyanakh, trans. from Mediko-Biologicheskaya Stantsiya, Sukhumi. Trudy (USSR), v1 1941.

Descriptors: (*Tuberculin, *Allergy), (*Mycobacterium tuberculosis, Immunity), Sensitivity, Vaccines, Monkeys, USSR.

P.P.D. possesses obvious advantages over Koch's old tuberculin relative to sensitivity after BCG vaccination. Monkeys show a 50% positive reactivity to P.P.D. and only 16% to Koch's old tuberculin. In lower monkeys, Koch's old tuberculin elicits no allergic reaction, through P.P.D. does. Using this fact, Burnet's hypothesis concerning allergy in lower monkeys was demonstrated to be untenable. Follow-up tuberculin reactivity tests conducted one year later indicated no essential deviation in further allergic reaction development in monkeys. (Author)
AD-653 947 HC$3.00 MF$0.65

COAGULATION IN HUMAN SHOCK.
Maryland Univ Baltimore Clinical Shock Unit
Safuh Attar. 1967, 4p
Contract DA-49-193-MD-2229, Grant PHS-HE-09341-03
Availability: Published in Maryland State Medical Journal Mar 1967.

Descriptors: (*Shock (Pathology), Blood coagulation), Hemorrhage, Septicemia, Cardiovascular diseases, Hypotension, Plasmin, Fibrinogen, Prothrombin, Therapy.

Analysis of coagulation and fibrinolytic studies in 200 patients in hemorrhagic, septic and cardiogenic shock is presented. An oscillatory behavior of the clotting mechanisms has been demonstrated. Although the same general pattern is obtained in fatal and non-fatal shock, the final outcome can be predicted by the amplitude and frequency of the oscillations. A prolongation of the silicone clotting time--frequently to unclottability, a significant decrease in fibrinogen, prothrombin activity, and marked reduction of clotting factors with markedly shortened euglobulin lysis time, were associated with a fatal outcome. (Author)
AD-654 060 Not available from CFSTI.

EFFECTS OF SEPTIC SHOCK ON RENAL FUNCTION IN HUMANS.
Maryland Univ Baltimore Clinical Shock Unit
Manfred Strauch, Joseph S. McLaughlin, Arlie Mansberger, John Young, and Paul Mendonca. 24 May 66, 8p
Contract DA-49-193-MD-2229
Availability: Published in Annals of Surgery v165 n4 p536-43 Apr 1967.

Descriptors: (*Kidneys, *Shock (Pathology)), Septicemia, Kidney function tests, Blood circulation, Mortality rates, Responses, Therapy.

Serial determinations of renal function in patients in septic shock showed severe depression of renal function probably as a result of decreased renal blood flow with a resultant decrease in glomerular filtration rate. There was a significant difference in the magnitude of reduction of renal function between survivors and nonsurvivors. The function in those who did not survive was reduced to 10% of normal, or less, and remained at these levels until death. (Author)
AD-654 061 Not available from CFSTI.

FIBRINOLYSIS IN THE DEAD FETUS SYNDROME.
Maryland Univ Baltimore Clinical Shock Unit
5 Oct 66, 6p
Contract DA-49-193-MD-2229, Grant PHS-HE-09341-02
Availability: Published in Obstetrics and Gynecology v29 n5 p662-6 May 1967.

Descriptors: (*Pregnancy, *Hemorrhage), Blood coagulation, Hypotension, Pathology, Kidneys, Fibrinogen, Embryos, Plasmin, Chemotherapy.

A patient with the dead fetus syndrome associated with hemorrhage, hypotension, and decreased renal function is presented. Her coagulation and fibrinolytic systems were studied extensively. There was evidence of marked increase in fibrinolytic activity without decrease in the clotting factors. She was treated successfully with fibrinogen and epsilon aminocaproic acid. (Author)
AD-654 062 Not available from CFSTI.

THE NATURE OF REFRACTORY SHOCK,
Maryland Univ Baltimore Clinical Shock Unit
Arlie R. Mansberger, Jr. 1967, 4p
Contract DA-49-193-MD-2229
Availability: Published in Maryland State Medical Journal Mar 1967.

Descriptors: (*Shock (Pathology), *Acidosis), pH, Lactates, Pyruvates, Blood proteins, Metabolic diseases, Epinephrine, Levarterenol, Vasoactive agents, Therapy.

Metabolic changes resulting from decreased perfusion states include: (1) The accumulation of significant amounts of acid metabolites as evidenced by a significant fall in venous pH; (2) Significant elevation of the absolute value of lactate and pyruvate and of excess lactate during decreased perfusion; (3) A precipitous fall in serum specific gravity and serum protein concentration with concomitant elevation of serum water concentration; (4) A demonstration that metabolic changes resulting from ischemia are time-related. (Author)
AD-654 063 Not available from CFSTI.

A STUDY OF SHOCK AND TRAUMA IN MAN UTILIZING THE RESOURCES OF A CLINICAL SHOCK TRAUMA UNIT,
Maryland Univ Baltimore Clinical Shock Unit
R. Adams Cowley. 1967, 3p
Contract DA-49-193-MD-2229
Availability: Published in Maryland State Medical Journal 3p Mar 1967.

Descriptors: (*Shock (Pathology), Medical research), Therapy, Hospitals, Humans, Medical personnel, Effectiveness, Medical laboratories.

Awareness at the University of Maryland School of Medicine of problems related to injury and shock resulted in the establishment of a Clinical Shock Trauma Unit (CSTU) to study the physiological, immuno-bacteriological and biochemical responses to injury in man. The mechanisms of operation included: (1) establishment of a Clinical Shock Trauma Unit for resuscitation, where pertinent data on trauma patients is collected on a 24-hour basis, and (2) modification of the animal research program in order to provide experimental data needed for support of observation in humans. (Author)
AD-654 064 Not available from CFSTI.

THE TREATMENT OF SHOCK IN A RESEARCH FACILITY,
Maryland Univ Baltimore Clinical Shock Unit
Joseph S. McLaughlin. 1967, 4p
Contract DA-49-193-MD-2229
Availability: Published in Maryland State Medical Journal n.p. Mar 1967.

Descriptors: (*Shock (Pathology), Therapy), Medical research, Hospitals, Septicemia, Chemotherapy, Blood volume, Acid-base equilibrium, Electrolytes (Physiology), Cardiovascular diseases, Blood pressure, Parenteral infusions.

During the past four years of operation, the Clinical Shock Trauma Unit at the University of Maryland Hospital has demonstrated that the detailed study of numerous physiologic and biochemical processes can be carried out simultaneously and in conjunction with the therapy of critically ill patients. Indeed, the survival rate in the study group has been superior to that generally reported. The feasibility of a clinical research area incorporating various medical and paramedical disciplines has been demonstrated. Within the next year, construction of a Shock Trauma Center incorporating an acute care facility, an operation room area with research facilities and an intensive care unit, will be initiated. This facility will provide the investigator with an opportunity to follow the patient during the complete course of his acute illness. (Author)
AD-654 065 Not available from CFSTI.

A CLINICAL SHOCK TRAUMA UNIT LOOKS AT FUTURE THERAPY FOR PATIENTS IN SHOCK,
Maryland Univ Baltimore Clinical Shock Unit
Elwood H. LaBrosse. 1967, 4p
Contract DA-49-193-MD-2229
Availability: Published in Maryland State Medical Journal 3p 1967.

Descriptors: (*Shock (Pathology), Therapy), Medical research, Hemorrhage, Mitochondria, Oxygen, Effectiveness, Hospitals, Medical laboratories.

The results of the studies up to the present time indicate that there is a significant change in the important intracellular organelles, mitochondria, as a result of shock, and that the treatment of animals which have been subjected to shock has shown an increase in survival when mitochondria, or mitochondrial fractions, have been administered. The use of these substances is aimed primarily at increasing the tissue utilization of oxygen by making the cells able to work more nearly at their normal efficiency. Additional investigation will be required to elucidate the mechanism of their therapeutic action. (Author)
AD-654 069 Not available from CFSTI.

EFFECT OF HEPARIN ON THE DECREASE IN BLOOD COAGULATION FACTOR ACTIVITY ASSOCIATED WITH EXPERIMENTAL ENDOTOXEMIA,
Walter Reed Army Inst of Research Washington D C
R. Lee West, Paul B. Jennings, Robert M. Hardaway, and Eric A. Lundberg. 20 Jul 66, 6p
Availability: Published in Annals of Surgery v165 n3 p351-6 Mar 1967.

Descriptors: (*Blood coagulation, *Septicemia), (*Heparin, Septicemia), Toxins + antitoxins, Escherichia coli, Prothrombin, Pathology.
Identifiers: Thromboplastin.

Preheparinized and nonheparinized mongrel dogs were given endotoxin, and clotting factor activity was studied using the one-stage prothrombin time and partial thromboplastin time. Loss of clotting factor activity in heparinized animals was largely prevented, whereas control animals lost significant amounts of clotting factor activity. Preheparinization did not affect mortality. The possible mechanisms by which heparin may prevent loss of clotting factor activity are discussed. (Author)
AD-654 076 Not available from CFSTI.

IMMUNIZATION FOR FOREIGN TRAVEL,
Walter Reed Army Inst of Research Washington D C
E. L. Buescher. 1967, 4p
Availability: Published in Medical Clinics of North America v51 n3 p843-6 May 1967.

Descriptors: (*Immunity, Public health), Law, Protection, Yellow fever virus, Cholera, Variola virus, Vaccines, United States.
Identifiers: Foreign travel.

Mandatory immunizations for foreign travel are few, consisting of vaccination against smallpox, and against yellow fever and cholera for those traveling to or from endemic areas. Other immunizations are not required by law, but are recommended on an area basis. The United States Public Health Service publishes a pamphlet, Immunization Information for International Travel, which can be procured from the Government Printing Office in Washington. (Author)
AD-654 078 Not available from CFSTI.

RESPIRATORY DISEASE AND THE ADENOVIRUSES,
Walter Reed Army Inst of Research Washington D C
Edward L. Buescher. 1967, 11p
Availability: Published in Medical Clinics of North America v51 n3 p769-79 May 1967.

Descriptors: (*Respiratory diseases, *Adenoviruses), Acute respiratory disease virus, Military medicine, Epidemiology, Etiology, Infections, Vaccines, Effectiveness, Immunity.

Acute upper respiratory infections caused by adenoviruses are by far the most significant cause of morbidity in military populations recently removed from civilian life. During winter months, adenovirus infection rates approach 100 per cent of susceptible recruits during 8 weeks of basic combat training. The disease is of variable clinical severity, but results in hospitalization of approximately half those infected. Both infection and disease caused by adenovirus type 4 can be effectively suppressed by administration of a living attenuated adenovirus type 4 vaccine. In one extensive field trial, however, suppression of type 4 virus fostered the emergence of type 7 virus in the immunized population. Type 7 virus, once introduced, ultimately replaced type 4 virus as the epidemic strain, and the ultimate result was no significant reduction in acute respiratory infections. (Author)
AD-654 079 Not available from CFSTI.

PHENOXYBENZAMINE IN SEPTIC SHOCK,
Walter Reed Army Inst of Research Washington D C
Robert W. Anderson, Paul M. James, Carl E. Brendenberg, and Robert M. Hardaway. 29 Sep 66, 10p
Availability: Published in Annals of Surgery v165 n3 p341-50 Mar 1967.

Descriptors: (*Shock (Pathology), *Chemotherapy), Sympatholytic agents, Septicemia, Responses, Heart, Blood circulation, Capillaries, Toxins + antitoxins, Vasoactive agents.
Identifiers: Phenoxybenzamine.

A series of young patients with well defined diagnoses and refractory clinical shock were studied hemodynamically. When conventional methods of therapy failed to correct hemodynamic deficits phenoxybenzamine was administered and physiologic parameters were carefully monitored. The pattern of response suggests that phenoxybenzamine improved cardiac function directly and thereby improved tissue capillary perfusion. (Author)
AD-654 084 Not available from CFSTI.

GASTRECTOMY AND IRON ABSORPTION: EFFECTS OF BLEEDING, IRON LOADING AND ASCORBIC ACID IN RATS,
Walter Reed Army Inst of Research Washington D C
Egmond E. Rieber, Marcel E. Conrad, and William H. Crosby. 25 Aug 66, 4p
Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v124 p577-80 1967.

Descriptors: (*Iron, Absorption (Biological)), (*Stomach, Excision), Deficiency diseases, Anemias, Ascorbic acid, Rats.

Gastrectomized rats developed iron deficiency because of decreased absorption of iron. Although these animals absorbed almost normal quantities of iron from test doses when they were iron replete, they were unable to increase absorption of iron appropriately in response to iron depletion. This suggested that iron deficiency occurred after gastrectomy because of an inability to adjust absorption in response to changes in the body requirement. (Author)
AD-654 085 Not available from CFSTI.

DEPLETION OF COAGULATION FACTORS IN DRUG-RESISTANT PLASMODIUM FALCIPARUM MALARIA.
Revised ed.,
Walter Reed Army Inst of Research Washington D C
Lewis H. Dennis, James W. Eichelberger, Max M. Inman, and Marcel E. Conrad. 4 Nov 66, 9p
Revision of manuscript received 25 Aug 66.
Availability: Published in Blood v29 n5 p713-21.

Descriptors: (*Plasmodium, Diseases), (*Antimalarials, *Resistance (Biological)), Military medicine, Pathology, Hemorrhage, Prothrombin, Blood platelets, Blood coagulation, Enzyme precursors, Fibrinogen, Thrombosis.
Identifiers: Thromboplastin.

United States soldiers with acute relapsed P. falciparum malaria had accelerated intravascular coagulation which was manifested by thrombocytopenia, a prolonged prothrombin time and partial thromboplastin time, a decrease in multiple coagulation factors, and evidence of decreased plasminogen activation with an accumulation of fibrinogen breakdown products in the blood. These changes may be important in the pathophysiology of malaria and cause the hemorrhage and thrombosis found in many organs of patients dying with falciparum malaria. (Author)
AD-654 088 Not available from CFSTI.

MALARIA AS UNDERSTOOD BY SOLDIERS,
Walter Reed Army Inst of Research Washington D C
A. T. C. Bourke, and Robert J. T. Joy. 1967, 6p
Availability: Published in Military Medicine v132 n5 p366-70 May 1967.

Descriptors: (*Military medicine, Epidemiology), (*Plasmodium, Diseases), Questionnaires, Antimalarials, Protective clothing, Army personnel, Insect repellents, Insecticides, Protective coverings, Training, Armed forces (Foreign), Vietnam.

Questionnaires about malaria were administered to 194 American, 182 Australian, and 280 Korean soldiers serving in Vietnam. Analysis of their responses indicate that the Australians had the best understanding of malaria and very high standards of malaria discipline. Although over two-thirds of American and Korean troops are adequately instructed about malaria and practice good malaria discipline, there is room for significant improvement if the malaria attack rates current at the time of this report continue to occur. Such improvement might be achieved by a better understanding of practical epidemiology by the troops; correction of lapses in protective clothing discipline; and assiduous attention by commanders to the logistics of antimalaria chemoprophylaxis, particularly during operations. (Author)
AD-654 089 Not available from CFSTI.

DETERMINING THE OSMOTIC FRAGILITY OF ERYTHROCYTES; A METHOD ESPECIALLY APPLICABLE TO PEDIATRICS,
Walter Reed Army Medical Center Washington D C
For primary bibliographic entry see Field 6A.
AD-654 090 Not available from CFSTI.

MULTIPLE MYELOMA AND THE NEPHROTIC SYNDROME. A BIOCHEMICAL AND MORPHOLOGIC STUDY,
Walter Reed Army Inst of Research Washington D C
Seymour Rosen, Stanley Cortell, Marvin M. Adner, Nicholas M. Papadopoulos, and Kevin G. Barry. 27 Jul 66, 14p
Availability: Published in American Journal of Clinical Pathology v47 n5 p567-79 1966.

Descriptors: (*Kidneys, Diseases), Pathology, Diagnosis, Biopsy, Histology, Cytochemistry, Proteins, Lipids.
Identifiers: Multiple myeloma.

A renal biopsy was obtained from a patient with the rare association of multiple myeloma and nephrotic syndrome. Light and electron microscopic investigation of this tissue disclosed extensive glomerular mesangial foam cell change and unusual basement membrane alterations. Analysis of serum revealed a marked increase of IgA protein and provided evidence to suggest that this myeloma protein complexed with low density lipoproteins. Such a protein-lipid interaction may have provided the stimulus for some of the glomerular abnormalities. (Author)
AD-654 091 Not available from CFSTI.

EXPERIMENTAL EVIDENCE OF EXCESS HEMOLYSIS IN THE COURSE OF CHRONIC IRON DEFICIENCY ANEMIA,
New England Medical Center Hospitals Boston Mass
H. J. Huser, E. E. Rieber, and A. R. Berman. 10 Aug 66, 11p
Contract AT (30-1)-2032
Prepared in cooperation with Tufts Univ., Boston, Mass., and Walter Reed Army Inst. of Research, Washington, D. C.
Availability: Published in Journal of Laboratory and Clinical Medicine v69 n3 p405-14 Mar 1967.

Descriptors: (*Iron, *Deficiency diseases), (*Anemias, Hemolysis), Erythrocytes, Primates, Diet, Blood counts, Labeled substances, Hemoglobin, Hematology.

Severe iron deficiency was produced in nonhuman primates (Papio doguera) by iron deficient diet and bleeding. Erythrokinetics were investigated at various stages. The natural history of iron deficiency in this species follows the pattern of iron deficiency in man. Excessive hemolysis was demonstrated by 51Cr and 59Fe methods and by increased reticulocyte counts. Excessive blood loss was excluded by the 51Cr method. The degree of hemolysis was related to the chronicity of the anemia rather than to its severity. Cross transfusion studies suggest intrinsic red cell defect. (Author)
AD-654 095 Not available from CFSTI.

EFFECT OF STAPHYLOCOCCAL ENTEROTOXIN ON THE FINE STRUCTURE OF MONKEY JEJUNUM,
Walter Reed Army Inst of Research Washington D C
T. G. Merrill, T. H. Kent, and H. Sprinz. 1967, 1p
Availability: Published in Federation Proceedings v26 n2 Mar-Apr 1967.

Descriptors: (*Digestive system diseases, *Toxins + antitoxins), Staphylococcus, Mitochondria, Intestines, Cytochemistry, Cell structure, Degradation, Monkeys.

Intragastric administration of purified staphylococcal enterotoxin B in monkeys produces an acute gastroenterities within 2 hours. The lesion reaches a maximum at 4 to 8 hours and rapidly regresses thereafter. At 2 hours mitochondria of crypt and villus epithelial cells are degenerated. This lesion correlates well with the near absent succinic dehydrogenase activity and occurs in the face of well preserved cytoplasmic constituents and normal nucleus. The tunica shows an acute exudative inflammatory response with neutrophils and macrophages predominating. There is increased inflammatory cell transmigration, increased cell extrusions but no undue separation of the lateral cell borders. At the 4 and 8 hour stages the inflammatory exudate diminishes and consists predominantly of lymphocytes and markedly enlarged macrophages, filled with phagosomes. The epithelial cells of the fore-shortened villi and elongated crypts show mitochondrial degeneration and numerous dense bodies. While E.R. and Golgi apparatus are normal the microvilli are shortened and irregular. The outstanding feature of this enteritis is the simultaneous involvement of crypt and villus cells and the severe degeneration of mitochondria which distinguishes it from other forms of acute jejunitis. e.g. bacterial. (Author)
AD-654 105 Not available from CFSTI.

QUANTITATIVE STUDIES OF PHYTOHEMAGGLUTININ-INDUCED DNA AND RNA SYNTHESIS IN NORMAL AND AGAMMAGLOBULINEMIC LEUKOCYTES,
Walter Reed Army Inst of Research Washington D C
For primary bibliographic entry see Field 6A.
AD-654 117 Not available from CFSTI.

SIMPLIFICATION OF THE CHROME-COBALT PARTIAL DENTURE CASTING PROCEDURE,
Michigan Univ Ann Arbor School of Dentistry
E. R. Dootz, R. G. Craig, and F. A. Peyton. 1967, 9p
Contract DA-49-007-MD-938
Prepared for presentation in part at the Meeting of the International Association of Dental Research in Toronto, Canada.
Availability: Published in The Journal of Prosthetic Dentistry v17 n5 p464-71 May 1967.

Descriptors: (*Prosthetics, Teeth), (*Casting, Prosthetics), Sodium compounds, Silicates, Ammonium compounds, Phosphates, Gels, Hardening, Chromium alloys, Cobalt alloys.

A rapid gelling shell casting investment was developed. Monoammonium phosphate and magnesium oxide are used as gelling and hardening agents for the sodium silicate. This allows rapid formation of shell layers. Chrome-cobalt partial denture frameworks may be cast in 1 hour when casting high-heat alloys, and in 2 hours when casting low-heat alloys. Castings produced by means of this investment and technique are as accurate as those obtained by conventional methods. This technique

has the following advantages: (1) a shortening of the time required for the fabrication of a partial denture casting; (2) approximately a 90 per cent reduction in the quantity of investment needed per casting; (3) a reduction in storage and shipment costs of large quantities of investment; (4) a lower operational cost for the burnout ovens, due to the shorter burnout cycle and more constant burnout temperature; and (5) the elimination of additional equipment (flasking rings or casting rings) used in other techniques. (Author)
AD-654 126 Not available from CFSTI.

SERIAL ELECTROCARDIOGRAMS: THEIR RELIABILITY AND PROGNOSTIC VALIDITY OVER A 24-YEAR PERIOD,
Naval Aerospace Medical Inst Pensacola Fla
William R. Harlan, Jr., Albert Oberman, Ashton Graybiel, Robert K. Osborne, and Robert E. Mitchell. 2 Mar 67, 28p Rept no. NAMI-999 NAVMED-MF022.03.02-5007
Contract NASA Order-R-136

Descriptors: (*Electrocardiography, Reliability), Aging (Physiology), Body weight, Blood pressure, Cardiovascular diseases, Predictions, Pathology, Diagnosis.

The reliability and prognostic validity of serial electrocardiograms were determined in a group of young men who were followed from 24 to 49 years of age. Electrocardiographic durations, amplitudes, and vectoral orientations at each of the four evaluations were similar to values from cross-sectional surveys of men at the same ages. The pattern of QRS deflections did not change although there were changes in the amplitude of these deflections. A significant decrease in QRS and T amplitude (Sigma QRS and Sigma T) was found with increasing aging and did not correlate significantly with weight and blood pressure. The QRS axis moved leftward as the group became older and the change in QRS axis was related to interval weight changes and to blood pressure. The T axis and the QRS-T angle did not change during the 24 years of study. The group in whom coronary heart disease subsequently developed had a greater decrease in QRS amplitude and tended to have a greater leftward movement of the QRS vector. The resting electrocardiogram is a reliable measurement despite minor serial changes in amplitude and vectoral orientation, but has limited predictive value in men below the age of 50 years. (Author)
AD-654 169 HC$3.00 MF$0.65

AN INVESTIGATION OF THE MECHANISM OF ADHESION TO TEETH.
Annual comprehensive rept., 29 Apr 66-28 Apr 67,
Harris Research Labs., Inc., Washington, D. C.
Anthony M. Schwartz, John D. Galligggan, and Francis Minor.28 Apr 67, 77p
Contract PH-43-64-530

Descriptors: (*Teeth, *Adhesives), (*Isocyanate plastics, Adhesives), Dentistry, Carboxylic acids, Acrylic resins, Adhesion.

Thin layers of adsorbed adhesion-promoting materials, called 'conditioners' and thick (10 microns to 100 microns) adhesive liners were found to promote adhesion to teeth. Among the conditioners the carboxylic acids were the most promising for use with acrylic restorations. Several polyurethanes, formed in situ on teeth under room conditions, were firmly attached to teeth even after immersion in water. Acrylic was adherent to these resins. These materials could be easily applied to teeth and rapidly cured and possessed good color. They were resilient and offered exceptional promise and adhesive liners for acrylics in a restorative system. Their adhesive properties were better than those obtained so far with the thinner conditioners. These polyurethanes also showed promise as complete restorations in themselves or as bulk additives to acrylic restoratives to provide adhesion. Wetting measurements on single crystals of hydroxyapatite showed that it had an easily wetted high energy surface. Such surfaces are characteristic of clean inorganic materials. (Author)
PB-174 848 HC$3.00 MF$0.65

SURVEILLANCE OF RESPIRATORY INFECTIONS IN AN INDUSTRIAL POPULATION.
Simi-annual contract progress rept., 1 Sep 66-28 Feb 67,
Virginia Univ., Charlottesville.
William S. Jordan Jr., Jack M. Gwaltney, Jr., and J. Owen Hendley. 28 Feb 67, 31p
Contract PH-43-63-1128

Descriptors: (*Respiratory diseases, Epidemiology), Etiology, Viruses, Mycoplasma, Adults, Children, Immunity, Vaccines, Culture media, Immune serums, Serodiagnosis.
Identifiers: Rhinoviruses.

Total respiratory and rhinovirus illness rates followed the same pattern in 1966-67 as in the preceding years. The consistency of the annual fall peak of rhinovirus common colds provides a favorable setting for the testing of possible control measures. A study of illnesses in families during this period showed that children were involved in the rhinovirus epidemic, but the incidence of illness in adults appeared to be unrelated to exposure to children in the home. Two new rhinovirus prototype strains, SF 23 and SF 365, were submitted as candidate serotypes. Increased detection of M. salivarium resulted from the use of direct agar culture in addition to diphasic medium for longitudinal surveillance of pharyngeal mycoplasma flora. Isolation rates for M. salivarium varied from 35% to 75%, and for M. pharyngis, from 0 to 78%, with no relation to season or recovery of rhinoviruses. Husbands and wives tend to harbor the same mycoplasma species, but children and their parents do not. (Author)
PB-174 868 HC$3.00 MF$0.65

6F. ENVIRONMENTAL BIOLOGY

MYCOLOGICAL STUDIES OF THE ALASKAN ARCTIC,
Arctic Inst of North America Washington D C
Yosio Kobayasi, Naohide Hiratsuka, Richard P. Korf, Keisuke Tubaki, and Kiyowo Aoshima. 1967, 139p
Contracts Nonr-1138 (01), Nonr-3996 (01)
Availability: Published in Annual Report of the Institute for Fermentation, Osaka p1-138 Feb 1967. Original contains color; reproducible in black/white only after original supply is exhausted.

Descriptors: (*Fungi, Alaska), (*Plants (Botany), Arctic regions), Environment, Identification, Classification, Morphology (Biology), Parasites, Ecology, Microbiology, Molds (Organisms).

Some arctic fungi show somewhat different appearances or fertility compared with the conspecific fungi of other regions because of the influences of severe arctic environmental conditions. Considered from a mycological point of view, the most explored part in the arctic regions are Arctic Scandinavia, especially Lappland, and then follow Spitsbergen, Greenland and Arctic Siberia. As for Arctic Alaska and Canada, the mycological explorations are admittedly incomplete, and in addition, the proper North American elements seem to be the inhabitants mixed with the modified European Arctic Alpine elements in these districts. Accordingly it is obvious that the identification of these fungi is accompanied with considerable difficulty.
AD-653 415 Not available from CFSTI.

6H. FOOD

WHOLESOMENESS OF IRRADIATED FOODS. AN ANNOTATED BIBLIOGRAPHY,
Massachusetts Univ Amherst Dept of Food and Nutrition
Elwood F. Reber, Krishan Raheja, and Dorothy Davis. 1966, 52p
Contract DA-49-193-MD-2634
Availability: Published in Proceedings of Federation of American Societies for Experimental Biology v25 n5 p1530-79 Sep-Oct 1966.

Descriptors: (*Irradiated foods, Bibliographies), Nutrition, Radiation effects, Hemorrhage, Deficiency diseases, Vitamins, Cancer, Proteins, Lipids, Degradation, Pathology, Preservation, Processing, Sterilization, Abstracts.

Contents: Sources of radiation; General papers on the wholesomeness of irradiated foods; Wholesomeness of irradiated foods; Hemorrhagic diathesis; Carcinogenicity; Effect of irradiation on enzyme systems; Nutritive value of irradiated food--proteins and lipids; Vitamin destruction in pure solution and in foods; Studies on nutritional and biochemical effects of irradiation.
AD-653 482 Not available from CFSTI.

HEATING MEDIA FOR PROCESSING FOODS IN FLEXIBLE PACKAGES, PHASE II.
Final rept., Jul 64-Sep 65,
Michigan State Univ East Lansing
I. J. Pflug, and C. Borrero. May 67, 132p
USA-NLABS-TR-67-47-GP
Contract DA-19-129-AMC-145 (N)

Descriptors: (*Food, Sterilization), (*Containers, Food), Heating, Steam, Air, Pasteurization, Military rations, Processing, Effectiveness.

The objective of this study was to evaluate and compare steam, steam-air and water heating media for processing flexible packages and to develop suitable procedures for using these heating media in commercial processing equipment. A multipoint temperature recording device which measured the temperature of the heating medium and in the container at various locations was used to evaluate temperature gradients and heating rates for the vertical and horizontal retort and for the steam-air pasteurizer. The temperature distribution pattern and the rate of heating of water in 303x406 cans were determined for 100% steam, 90% steam-10% air and 75% steam-25% air mixtures, and water in a commercial vertical and horizontal retort and for a steam-air mixture in an atmospheric pasteurizer. Steam-air and water were evaluated at air flow rates in the range of 10-30 cfm. Steam and steam-air were evaluated using natural and mechanical circulation. The performance of the 3 heating media were studied in the vertical retort using both a cross and a circular spreader system. Satisfactory control procedures for processing flexible packages in the 3 heating media were developed for both horizontal and vertical commercial retorts. The horizontal retort was found to be a more effective configuration for processing using steam-air mixtures. (Author)
AD-653 596 HC$3.00 MF$0.65

COMMERCIAL BAKING EQUIPMENT IN JAPAN.
Pacific Products, Ltd., Tokyo (Japan).
Sep 65, 81p
PB-173 723-Superseded. Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Bread, *Cooking devices), (*Kitchen equipment + supplies, Japan), Commerce, Food, Flour, Money, Machines, Commerce, Packaging.

Important information from the survey has been summarized. The text of the report first describes

briefly the baking industry and demand for baked goods in Japan, then devotes a section to the market for bakery equipment, trends in the use of equipment, and government supports. Competitive factors are then reviewed with emphasis on Japanese bakery machinery makers. Factors related to import marketing are reviewed and the text closes with notes on trade promotion aids.
PB-174 787 HC$3.00 MF$0.65

6J. INDUSTRIAL (OCCUPATIONAL) MEDICINE

THE TOXICOLOGICAL CHARACTERISTIC OF HYDRAZINE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 6T.
AD-653 546 HC$3.00 MF$0.65

6K. LIFE SUPPORT

A PATENT SEARCH FOR MOVING BEDS FOR ABSORPTION, TO CLEAN AIR.
Technical note,
Naval Ship Research and Development Center Annapolis Md Annapolis Div
W. R. Calbert. Jun 67, 19p
NSRDC-208/67

Descriptors: (*Controlled atmospheres, Adsorption), (*Submarines, Controlled atmospheres), Catalysts, Fluidized bed processes, State-of-the-art reviews, Patents, Air, Decontamination, Purification.
Identifiers: Adsorbents.

A ventilation system is yet to be developed for providing clean air to displace contaminated air in submarine atmospheres. A moving bed adsorption means is one approach to the removal of contaminations and providing of high purity air. A state of the art search was made to list and sort disclosures of interest. (Author)
AD-653 461 HC$3.00 MF$0.65

THE CORRECTION OF HELIUM SPEECH DISTORTION.
HRB-Singer Inc State College Pa
For primary bibliographic entry see Field 17B.
AD-653 471 HC$3.00 MF$0.65

SPEECH IN AN ARTIFICIAL ATMOSPHERE (44% OXYGEN-56% HELIUM).
Aerospace Medical Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 17B.
AD-653 519 HC$3.00 MF$0.65

PERFORMANCE MEASURES FOR HUMAN FACTORS ENGINEERING EVALUATION OF EARL EQUIPMENT.
Final rept.
Dunlap and Associates Inc Darien Conn
30 Jun 66, 149p Rept no. SSD66-332 (618)
Contract DA-18-035-AMC-702 (A)
Original contains color reproducible in black/white only after original supply is exhausted.

Descriptors: (*Breathing masks, *Group dynamics), (*Human engineering, *Logistics), Performance (Human), Howitzers, Military personnel, Psychometrics, Motivation, Environment, Protective masks, Military tactics, Tactical warfare, Video networks, Electronic recording systems.

A simple measurement design is inadequate for field testing of teams. Observations must be structured to detect separate patterns of performance across multiple variables, individual team members, and various subtasks. Human observers at the field site cannot alone record this wide range of data at the pace of team performance. Data recording equipment, particularly videorecorders, assure a more adequate and objective data collection. Performance of certain team tasks, generally those requiring individual initiative in coordinating activity, may be significantly altered by the wearing of the protective masks. Other tasks of a repetitive drill nature may be much less affected. Even very meticulous testing during field training activity may fail (because of the 'slack time' and indirect motivations inherent in the practice environment) to reflect validly potential decrements in a tactical environment. For 105-mm howitzer crews specifically, there will probably be no consistently critical performance problems while wearing protective masks, although the team's normal pattern of oral intercommunication is definitely disrupted.
AD-653 627 HC$3.00 MF$0.65

ORIFICE SELECTION IN SEMI-CLOSED CIRCUIT MIXED GAS underwater breathing apparatus.
Research rept.,
Navy Experiment 1 Diving Unit Washington D C
J. V. Harter. 13 Apr 67, 31p Rept no. RR-1-67

Descriptors: (*Breathing apparatus, *Orifices), Underwater, Selection, Gas flow, Mixtures, Graphics, Pressure, Diving, Control systems.

The report was prepared to support Man-in-the-Sea Operations wherein the gas flow requirements in semi-closed circuit breathing apparatus will vary over a wide range due to extension of diving depths in semi-closed circuit breathing apparatus to 600 feet of seawater. A graphical method of orifice selection is presented. Information for graph preparation was obtained through computer operations using standard compressible fluid flow formula for critical flow through an orifice. (Author)
AD-654 157 HC$3.00 MF$0.65

EVALUATION OF FUEL CELL WATER FOR HUMAN CONSUMPTION.
Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-patterson AFB, Ohio.
B. J. Katchman, G. Kitzes, C. Linder, S. A. London, and A. R. Slonim. Nov 66, 15p NASA-CR-84845, AMRL-TR-66-141
Contract AF 33/657/-11716

Descriptors: *Human engineering, *Hydrox fuel cell, *Water recovery, Analysis, Cell, Chemistry, Consumption, Engineering, Evaluation, Fuel, Human, Hydrogen, Hydrox, Impurity, Microorganism, Nutrition, Oxygen, Physiology, Recovery, Space, Vehicle, Water.

For abstract, see STAR 05 15.
N67-28829 HC$3.00 MF$0.65

6L. MEDICAL AND HOSPITAL EQUIPMENT

ELECTROCHEMICAL BEHAVIOR OF METALS AS STIMULUS ELECTRODES,
State Univ of New York Stony Brook
Sumner N. Levine. 6 Dec 66, 6p
AFOSR-67-1117
Grant AF-AFOSR-667-65
Availability: Published in J. Biomed. Mater. Res. v1 p27-31 1967.

Descriptors: (*Electrophysiology, Electrodes), (*Electrodes, Electrochemistry), (*Electrochemistry, Electrophysiology), Anodes, Metals, Ionization, Decomposition, Transport properties, Tissues (Biology), Stimulation, Implants.
Identifiers: Pacemakers, Stimulus electrodes.

A theory for the behavior of anodes as stimulus electrodes, particularly as pacemaker electrodes, is presented. Expressions are obtained for the minimum duration and energy of the stimulus. These expressions are applied to that for the dissolution of the anode and transport of the resulting ions in the tissue in order to obtain an estimate of the extent of penetration. Comparison with experimental data indicates good agreement. (Author)
AD-653 682 Not available from CFSTI.

6M. MICROBIOLOGY

COMPARISON OF ACETATE DIFFERENTIAL AGAR WITH SELLERS CITRATE-MANNITOL-AGAR,
School of Aerospace Medicine Brooks AFB Tex
Joseph T. Cordaro, and Robert J. Ball. 2 May 66, 6p Rept no. SAM-TR-66-236
Availability: Published in Applied Microbiology v14 n6 p886-7 Nov 1966.

Descriptors: (*Enterobacteriaceae, Separation), (*Escherichia coli, *Culture media), Shigella, Salmonella, Efficiency, Growth, Diagnosis.

Two hundred and forty-five Escherichia coli paracolons were employed in comparing the use of Acetate Differential Agar (Ac) with the simple test described by Sellers to eliminate these organisms from consideration as enteric pathogens. The media were inoculated simultaneously and at 18 hr 83% of the isolates produced a positive citrate reaction on Sellers Citrate Mannitol Agar (SCM) while 7% gave a positive reaction on Ac. At 24 hr 92% of the cultures were positive on SCM versus 42% on Ac. At 48 hr 244 (99.6%) of the isolates were positive on SCM while at 72 hr incubation period was required for equal results with Ac. One isolate failed to grow on either medium. (Author)
AD-653 686 Not available from CFSTI.

NUTRITIONAL REQUIREMENTS OF ENTEROTOXIGENIC STRAINS OF STAPHYLOCOCCUS AUREUS.
Terminal progress rept., 1 Sep 65-31 Dec 66,
North Carolina Univ Chapel Hill Dept of Environmental Sciences and Engineering
Robert A. Mah, and Lloyd W. Regier. 31 Dec 66, 50p
Contract DA-49-193-MD-2374

Descriptors: (*Staphylococcus aureus, *Nutrition), Amino acids, pH, Inorganic compounds, Carbon dioxide, Toxins + antitoxins, Oxygen, Vitamins, Salts, Temperature, Growth, Culture media, Glucose, Tables, Gases, Carbon, Glutamic acid.

In developing a synthetic medium for Staphylococcus aureus S-6, the following criteria were chosen: growth for 24 hr at 37 C with continuous shaking, minimum acceptable yield of 200 Klett Units. Growth was defined on the basis of these stringent, arbitrary criteria; positive growth was reported only if they were met. The defined medium developed was composed of inorganic salts, 11 amino acids (glycine, valine, leucine, threonine, phenylalanine, tyrosine, cysteine, methionine, proline, arginine, and histidine), and 3 vitamins, thiamine, nicotinic acid, and biotin. Biotin was a growth factor requirement in S-6 when glutamic acid but not glucose was used as a carbon source. The quantity of enterotoxin B was ca 7 times less in the defined than in complex medium, even though growth yields were similar. Any modification of the initial pH of the medium resulted in some loss of enterotoxin production, regardless of whether it was initially altered without further change, buffered with phosphate at constant level, or adjusted throughout the growth cycle by addi-

tion of acid or base. Both growth yield and toxigenesis were diminished at the two extremes of temperature, 15 and 43 C, tested; it is of practical importance that enterotoxin can be produced at these temperatures. Varying concentrations of CO2 in pure O2 were not beneficial for toxigenesis. With increased sparging of air or pure O2 into growing cultures, growth but not toxigenesis was stimulated; however, at high sparge rates, both were drastically reduced. An optimum air or O2 sparge-rate exists for growth or toxigenesis. (Author)
AD-654 031 HC$3.00 MF$0.65

DETECTION OF CLOSTRIDIAL HEMOLYSIN FORMED IN VIVO,
Walter Reed Army Inst of Research Washington D C
Howard E. Noyes, and Ronald Easterling. 19 Nov 66, 9p
Availability: Published in Journal of Bacteriology v93 n4 p1254-61 Apr 1967.

Descriptors: (*Clostridium, *Hemolysis), (*Toxins + antitoxins, Clostridium), In vivo analysis, Necrosis, Wounds + injuries, Diseases, Goats.

Experimental clostridial myonecrosis closely resembling gas gangrene was produced in goats by the intramuscular injection of washed clostridia suspended in adrenalin. The preparation provides a model for the study of clostridial myonecrosis that is relatively isolated from preceding trauma. A new test for the demonstration of clostridial exotoxins, the hemolysin indicator plate test, was described. This test gave reliable results within 6 hr. and only minute quantities of test material were required. Application of this test to wound exudates of goats with experimental clostridial myonecrosis demonstrated the presence of the gamma toxin of Clostridium novyi, alpha toxin of C. septicum, and the alpha toxin of C. perfringens in exudates from animals injected with washed Clostridium bacilli suspended in adrenalin. Exudates from goats injected with C. perfringens were lethal for mice and produced necrosis of guinea pig skin typical of C. perfringens. The convincing demonstration of clostridial exotoxins formed in vivo in this experimental model could be the basis for definition of clostridial exotoxin actions which have evaded study in the past. (Author)
AD-654 077 Not available from CFSTI.

PRODUCTION OF L FORMS OF NEISSERIA MENINGITIDIS BY ANTIBIOTICS,
Walter Reed Army Inst of Research Washington D C
Richard B. Roberts. 7 Oct 66, 5p
Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v124 p611-5 1967.

Descriptors: (*Neisseria meningitidis, Growth), Antibiotics, Culture media, Sensitivity, Resistance (Biological), Morphology (Biology).

L forms of group B Neisseria meningitidis were produced by penicillin, methicillin, ampicillin, cephalothin, cycloserine, ristocetin, bacitracin and vancomycin. These L forms were propagated serially on medium containing each antibiotic, and all L forms had similar growth, morphologic and fermentative properties. Revertant organisms from each antibiotic-induced L form had the same fermentative properties and antibiotic sensitivities as the respective parent meningococcus. Furthermore each revertant strain agglutinated with group B meningococcal antisera. L forms were more resistant than the parent organism to those antibiotics that were capable of producing L forms, except in the case of ristocetin where parent and L forms exhibited the same sensitivity. Parent and L form organisms exhibited similar sensitivities to novobiocin, tetracycline and erythromycin, and L forms were not produced by these antibiotics or by sulfisoxazole. (Author)
AD-654 080 Not available from CFSTI.

MICROTITER HEMAGGLUTINATION-INHIBITION ASSAY FOR STAPHYLOCOCCAL ENTEROTOXIN B,
North Carolina Univ Chapel Hill Dept of Environmental Sciences and Engineering
Stephen A. Morse, and Robert A. Mah. 8 Jul 66, 4p Rept no. Pub-142
Contract DA-49-193-MD-2374
Availability: Published in Applied Microbiology v15 n1 p58-61 Jan 1967.

Descriptors: (*Toxins + antitoxins, Microanalysis), Accuracy, Staphylococcus, Volumetric analysis.

The rapid microtiter technique was investigated as a means of facilitating the detection of staphylococcal enterotoxin B. With this technique, many samples were assayed simultaneously, and readable results were obtained in 3 hr. Other advantages of this method, in addition to speed, were the small quantity of reactants used, ease of reading, and reproducibility. (Author)
AD-654 103 Not available from CFSTI.

EFFECT OF STAPHYLOCOCCAL ENTEROTOXIN ON THE FINE STRUCTURE OF MONKEY JEJUNUM,
Walter Reed Army Inst of Research Washington D C
For primary bibliographic entry see Field 6E.
AD-654 105 Not available from CFSTI.

VIABILITY OF MICROORGANISMS IN THE DESERT SOILS OF TURKMENIA.
Zhiznespososbnost Mikroorganizmov V Pustynnykh Pochvakh Turkmenii
Scientific Translation Service, La Canada, Calif. V. KH.Kozlova, and A. I. Zhukova. Feb 67, 8p
NASA-TT-F-10721
Contract NASW-1496
Transl. Into English From Mikrobiologiya (Moscow), V. 34, No. 3, 1966 P 503-508

Descriptors: *Desert adaptation, *Irradiation, *Mars environment, *Microorganism, *Temperature effect, *Viability, Adaptation, Air, Carbon dioxide, Desert, Dry, Effect, Environment, Humidity, Mars, Mass, Reproduction, Soil, Temperature, U.S.S.R., Water.

For abstract, see STAR 05 15.
N67-28222 HC$3.00 MF$0.65

SURVEILLANCE OF RESPIRATORY INFECTIONS IN AN INDUSTRIAL POPULATION.
Virginia Univ., Charlottesville.
For primary bibliographic entry see Field 6E.
PB-174 868 HC$3.00 MF$0.65

6N. PERSONNEL SELECTION AND MAINTENANCE (MEDICAL)

INTERACTION OF CHRONIC COLD EXPOSURE AND PHYSICAL TRAINING UPON HUMAN BODILY TOLERANCE TO COLD.
Oslo Univ (Norway) Inst of Work Physiology
For primary bibliographic entry see Field 6S.
AD-653 645 HC$3.00 MF$0.65

SCUBA DIVING-BIOLOGIC AND PHYSICAL ASPECTS.
Aeromedical Reviews,
School of Aerospace Medicine Brooks AFB Tex
Chester L. Ward. Mar 67, 42p Rept no. Review-1-67

Descriptors: (*Scuba divers, Physiology), (*Diving, Hazards), Physical fitness, Breathing apparatus, Anatomy, Cardiovascular system, Respiratory system, Drowning, Water pollution, Exposure, Underwater explosions, Diseases, Wounds + injuries, Gas embolism, Decompression sickness, Oxygen, Toxicity, Nitrogen, Anesthesia, Poisoning, Carbon monoxide, Carbon dioxide, Hypoxia, Hyperventilation.

Contents: Physical fitness; Diving physics; Anatomy and physiology; Environmental hazards; Diver's diseases and injuries; Diving and decompression tables; Bibliography; U. S. Navy air decompression tables.
AD-653 945 HC$3.00 MF$0.65

6O. PHARMACOLOGY

THE EFFECTS OF THIAZESIM, LSD-25, AND BILATERAL LESIONS OF THE AMYGDALAE ON THE RELEASE OF A SUPPRESSED RESPONSE,
Texas Univ Galveston Medical Branch
For primary bibliographic entry see Field 5J.
AD-653 423 Not available from CFSTI.

FEASIBILITY AND POTENTIAL EFFECTIVENESS OF PARTIAL-BODY SHIELDING FOR PERSONNEL PROTECTION AGAINST IONIZING RADIATION,
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 6R.
AD-653 459 HC$3.00 MF$0.65

NEUROPHARMACOLOGICAL STUDIES AND POSTULATES ON EXCITATION AND DEPRESSION IN THE CENTRAL NERVOUS SYSTEM,
California Univ Los Angeles Brain Research Inst
Wallace D. Winters. 1967, 35p
AFOSR-67-1316
Contract AF 49 (638)-1387
Availability: Published in Recent Advances in Biological Psychiatry v9 Chap22 p313-45 1967.

Descriptors: (*Anesthesia, Electroencephalography), (*Anesthetics, Pharmacology), Nervous system, Physiology, CNS depressants, CNS stimulants, Electrophysiology, Brain, Sleep, Responses, Drugs, Hallucinogens, Ethers, Epilepsy, Lysergic acids, Psychiatry.

Rhombencephalic sleep (RPS) is more similar to the awake distracted or hallucinatory state than to slow-wave sleep. CNS depression or excitation cannot be assessed only by evaluating the responsiveness of the subject, i.e., the less responsive the greater the depression. The subject that is unresponsive during RPS is no less responsive than it is during epileptic, hallucinatory, or anesthetic states. Loss of the arousal response is not necessarily correlated with a CNS depression, since it can also occur during hyperexcitability. Any agent which can induce a reduction in responsiveness and loss of memory can be confused with, and considered to be, an anesthetic agent. GHB, though reported to be an anesthetic agent, has properties like alpha-chloralose, phencyclidine, and trichlorethylene, all of which appear to be hallucinatory and epileptoid agents. A continuum of increasing excitability may exist beginning with increased motor activity, hallucinatory behavior, and finally generalized seizures. The hallucinatory 'aura' preceding grand mal seizures is a possible example of this continuum. Nitrous oxide appears to be purely an hallucinatory agent. Ether induces an initial hallucinatory state followed by CNS depression. The proposed model indicates that sensory-input systems have an increased modulation during excited states and a reduced modulation during depressed states. (Author)
AD-653 680 Not available from CFSTI.

INVESTIGATION OF INTRAVENOUS FAT EMULSIONS.
Louisiana State Univ New Orleans Dept of Surgery
For primary bibliographic entry see Field 6E.
AD-653 839 HC$3.00 MF$0.65

EFFECT OF INTRARECTAL DEXAMETHASONE ON SERUM FREE 17-OHCS LEVELS.
School of Aerospace Medicine Brooks AFB Tex
For primary bibliographic entry see Field 6E.
AD-653 941 HC$3.00 MF$0.65

PHENOXYBENZAMINE IN SEPTIC SHOCK,
Walter Reed Army Inst of Research Washington D C
For primary bibliographic entry see Field 6E.
AD-654 084 Not available from CFSTI.

4- (1-METHYL-4-PYRROLIDINOBUTYLAMINO)-7-CHLOROQUINOLINE AND 4- (1-METHYL-4-MORPHOLINOBUTYLAMINO)-7-CHLOROQUINOLINE AS POTENTIAL ANTIMALARIALS.
Revised ed.,
Walter Reed Army Inst of Research Washington D C
Peter K. Iber, and Betty J. Boone. 19 Jan 67, 1p
Revision of manuscript submitted 29 Sep 66.
Availability: Published in Journal of Medicinal Chemistry v10 p509 1967.

Descriptors: (*Antimalarials, *Quinolines), Plasmodium, Diseases, Resistance (Biological), Effectiveness, Pharmacology.

Increased interest in finding a prophylactic agent against drug-resistant Plasmodium falciparum and Plasmodium vivax has led to the synthesis of two new substituted quinolines, 4- (1-methyl-4-pyrrolidinobutylamino)-7-chloroquinoline (I) and 4- (1-methyl-4-morpholinobutylamino)-7-chloroquinoline (II) (Table I). 4- (1-Methyl-4-bromobutylamino)-7-chloroquinoline (III), upon reaction with morpholine or pyrrolidine, gave I and II, respectively. Preliminary reports show these compounds to be active against Plasmodium berghei infected mice. (Author)
AD-654 092 Not available from CFSTI.

PRECLINICAL TOXICOLOGY OF NSC 526051 IN MICE, RATS, GUINEA PIGS, RABBITS AND DOGS.
Little (Arthur D.), Inc., Cambridge, Mass.
5 Jun 67, 48p
Contract PH-43-65-61

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Dosage, Absorption spectrum, Stability, Tissues (Biology), Toxic tolerances, Responses, Hematology, Blood chemistry, Pathology, Pharmacology, Chemical properties, Physical properties, Amines, Toluenes, Sodium compounds, Sulfonates, Mice, Rats, Guinea pigs, Rabbits, Dogs.
Identifiers: Anilino sodium toluenesulfonate.

Alpha-Toluenesulfonic acid, alpha-anilino-sodium salt, monohydrate was studied for preclinical toxicological effects following intravenous administration in mice, rats and dogs, and subcutaneous and intramuscular injection in guinea pigs and rabbits. Single-dose LD50 values determined in Swiss mice and Sprague-Dawley rats were 491.5 mg/kg and 315.5 mg/kg, respectively. Local effects of the compound in guinea pigs and raabits appeared minimal after subcutaneous injection of 0.125 ml and intramuscular injection of 0.125-0.25 ml of a 60 mg/ml solution. Injection of larger volumes produced an acute inflammatory response with focal swelling, hyalinization and necrosis of the muscle fibers. Data from repeated-dose intravenous studies in three dogs suggest a deleterious effect on the liver, as indicated by moderate, transient rises in SGPT observed at both the 100 and 200 mg/kg levels. Microscopic examination of tissues from dogs sacrificed 33 or 52 days after the last dose at these levels characteristically revealed slight focal hemorrhage of lung and myocardial tissues, and moderate hemosiderosis in the spleen. Similar hemorrhagic lesions were observed in one dog administered 600 mg/kg and sacrificed in a moribund state on Day 2. In addition, this animal showed vocal necrosis of lymph nodes and myocardial tissue and focal hepatic fatty metamorphosis. (Author)
PB-174 865 HC$3.00 MF$0.65

THE LD50 OF METHOTREXATE (NSC-740) BY THE ORAL ROUTE IN UNILATERALLY NEPHRECTOMIZED, SHAM OPERATED AND NORMAL MICE.
Research rept.,
Mason Research Inst., Worcester, Mass.
Zareh Hadidian. 6 Oct 66, 4p
Contract PH-43-64-51

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Kidneys, Excision, Dosage, Mortality rates.
Identifiers: Methotrexates.

The object of this study was to determine whether Methotrexate (NSC-740) has greater toxicity in unilaterally nephrectomized animals. For this purpose the LD50 of the compound was determined by the oral route in unilaterally nephrectomized, sham operated and normal mice. According to the results of this experiment, nephrectomy does not alter the LD50 value of NSC-740; but this experiment is not definitive. The lowest LD50 of 251 mg/kg obtained with the nephrectomized male mice was not significantly different than that obtained with the control males, 279 mg/kg; but the control males were not from the original batch of animals, although they were presumably from the same stock and of the same age. On the other hand the LD50 for the sham operated animals is signficantly higher than the LD50 for the nephrectomized groups; but there is a good possibility that this high value is aberrant due to poor absorption of the compound from the gastrointestinal tract at high dose levels. So the possibility remains that there is a real biological effect which can be demonstrated with male animals at the proper stage of the post-nephrectomy period and with a route of administration other than oral. (Author)
PB-174 869 HC$3.00 MF$0.65

6P. PHYSIOLOGY

A TECHNIQUE FOR DETERMINING AN INDEX OF VISUAL ALERTNESS FROM THE ELECTROENCEPHALOGRAM,
Naval Air Development Center Johnsville Pa Aerospace Medical Research Dept
George E. Bergey, William C. Sipple, William A. Hamilton, and Russell D. Squires. 23 May 67, 27p Rept no. NADC-MR-6618

Descriptors: (*Visual perception, Electroencephalography), Frequency analyzers, Band-pass filters, Electrophysiology, Voltage, Signals, Switching circuits.

A technique is described for evaluating the visual alertness of humans. This technique utilizes a transistorized EEG analyzer consisting of an automatic signal level control, a number of paralleled active bandpass filters, and a switching arrangement to allow modification of bandpass characteristics by the user. The output of the analyzer consists of four D.C. signals, the voltage of each being proportional to the EEG activity within the variable frequency bands selected by the experimenter. This evaluation of visual alertness involves monitoring these four analyzer outputs while the subject performs a routine designed to provide alpha suppression. (Author)
AD-653 451 HC$3.00 MF$0.65

REVIEW OF CLINICAL AND EXPERIMENTAL STUDIES IN CONDITIONAL REFLEXES, PSYCHO AND NEUROPHYSIOLOGY IN U.S.S.R., CZECHOSLOVAKIA AND GREAT BRITAIN JUNE 1966 - SEPTEMBER 1966,
Duke Univ Durham N C Medical Center
Senford I. Cohen. Sep 66, 361p
AFOSR-67-1246
Grant AF-AFOSR-57-64

Descriptors: (*Conditioned reflex, *Central nervous system), Autonomic nervous system, Physiology, Nervous system, Peripheral nervous system, Cybernetics, Cardiovascular system, Cardiovascular diseases, Pathology, Hypertension, Emotions, Stress (Psychology), Blood circulation, Sensory deprivation, Electrophysiology, Pharmacology, Toxicity, Sensory perception, Performance (Human), Motor reactions, Muscles, Responses, Nystagmus, Hypnosis, Blood pressure, Respiration, Corticosteroid agents, Excretion.

The document contains reports in the following areas: (1) Neurohormonal and neurophysiological mechanisms related to integrative and adoptive central nervous system functions. (2) The relationship of central and peripheral nervous system activity to conditional reflex patterns and the application of a cybernetic model in the evaluation of the various parameters of conditional reflexes particularly as this concerned the cardiovascular system. (In connection with this, there was ample opportunity to review a wide variety of evaluative techniques of hemodynamic functions.) (3) The application of conditional reflex methods and techniques of evaluating dimensions of central nervous system activity of value in studying individual differences in central nervous system reactivity. (4) The utilization of conditional reflex methods in the clinical evaluation of psychopathology, neuropathology and physiopathology.
AD-653 594 HC$3.00 MF$0.65

HUMORAL CONTROL OF THE ERYTHROPOIESIS DURING ALTITUDE CHANGES.
Annual rept., no. 2, May 66-Apr 67,
Instituto de Biologia Andina Lima (Peru)
Cesar Reynafarje, Jose Ramos, Jorge Gurmendi, Doris Villavicencio, and German Anduaga. Apr 67, 19p
Grant DA-ARO-49-092-65-G90
See also AD-639 752.

Descriptors: (*Hypoxia, *Hematology), (*Acclimatization, *Hemopoietic system), Erythrocytes, High altitude, Inhibition, Blood plasma, Peru.

Some aspects of the inhibitory effect of plasma obtained from altitude natives who sojourned to sea level for 9 to 11 days were studied, as well as the effect of plasma from polycythemic dogs exposed to hyperbaric pressure of 4 atmospheres, and rats previously stimulated in low pressure chamber. Total plasma from altitude natives after 9 days at sea level produced less incorporation of Fe-59, than did normal plasma from sea level subjects. There is good relationship between administered dose and depressing effect. The depressing effect of plasma from altitude natives, brought down to sea level, on young nucleated red cells is evident. Plasma from polycythemic dogs exposed to hyperbaric pressure of 4 atmospheres produced less incorporation of Fe-59 on stimulated rats, in comparison with rats having plasma from normal sea level dogs or saline. (Author)
AD-653 665 HC$3.00 MF$0.65

NEUROPHARMACOLOGICAL STUDIES AND POSTULATES ON EXCITATION AND DEPRESSION IN THE CENTRAL NERVOUS SYSTEM,

California Univ Los Angeles Brain Research Inst
For primary bibliographic entry see Field 6O.
AD-653 680 Not available from CFSTI.

ELECTROCHEMICAL BEHAVIOR OF METALS AS STIMULUS ELECTRODES,
State Univ of New York Stony Brook
For primary bibliographic entry see Field 6L.
AD-653 682 Not available from CFSTI.

THE PROPERTIES OF THE STRIA TERMINALIS FIBRES,
Cajal Inst Madrid (Spain) Dept of Biophysics
A. Fernandez de Molina, and J. L. Garcia-Sanchez. 29 Nov 66, 6p
AFOSR-67-1331
Contract AF 61 (052)-939
Availability: Published in Physiology and Behavior v2 p225-7 1967.

Descriptors: (*Nerve fibers, *Brain), Nerve impulses, Electrophysiology, Morphology (Biology), Spain.

The action potential of the stria terminalis was studied in chloralose anesthetized cats after exposure of the caudothalamic surface. Two groups of fibres were differentiated on the basis of threshold, conduction velocity and duration of the absolute refractory period. The peak conduction velocities are 1.8--2.3 m/sec for the fast conducting fibres and 0.6--0.75 m/sec for the slow conducting ones. The significance of the results as to the nature of these fibres is discussed. (Author)
AD-653 709 Not available from CFSTI.

FINAL TECHNICAL REPORT ON RESPIRATION.
California Univ San Francisco Medical Center
1967, 10p
Contract Nonr-222 (55)

Descriptors: (*Respiration, Physiology), Respiratory system, Reflexes, Lungs, Arteries, Aorta, Blood circulation, Chemoreceptors, Muscles, Necrosis, Capillaries, Edema, Oxygen, Carbon dioxide, Hemoglobin, Reports.

Contents: Physiological mechanisms regulating the caliber of the bronchioles and alveolar ducts; Reflex control of respiration; Regulation of respiration; Hyperpnea of muscular exercises; Structure-function relationships in the lung; Micro-injury to the lung; Studies on pulmonary circulation; Continuous measurement of R (CO2/O2); Pulmonary edema; Hemoglobin, oxygen kinetics.
AD-653 738 HC$3.00 MF$0.65

TYPES OF INFORMATION STORED IN SINGLE NEURONS,
California Inst of Tech Pasadena Div of Biology
Felix Strumwasser. 1966, 31p
AFOSR-67-1371
Contract AF 49 (638)-1447, Grant NGR-05-002-031
Availability: Published in Proc. Conf. on Invertebrate Nervous Systems p291-319 1966.

Descriptors: (*Nerve cells, Electrophysiology), Neuromuscular transmission, Nerve impulses, Membranes (Biology), Ions, Inhibition, Ganglia, Rhythm (Biology), Photoperiodism, Ribonucleic acids, Biosynthesis.

Neurons are highly specialized cells with properties that appear to be remarkably similar in vertebrates and invertebrates. It is thus possible to list the sorts of general information any nerve cell in the animal kingdom must possess for its differentiation. A list of eight obvious but important types of information that nerve cells are equipped with was discussed in this paper. Emphasis was placed on two types of information stored in nerve cells--endogenous activity and the timing of external events. It is entirely possible and often advantageous to study these phenomena in the nervous system of invertebrates. (Author)
AD-653 801 Not available from CFSTI.

COLOR INDUCTION USING ASYNCHRONOUS FLASHES,
Naval Submarine Medical Center Groton Conn
Jo Ann S. Kinney. 20 Feb 66, 24p Rept no.
NSMC-496
NAVMED-MF022.03.03-9006.46
Availability: Published in Vision Res. v7 p299-318 1967.

Descriptors: (*Color vision, Perception (Psychology)), Retina, Adaptation (Physiology), Masking, Colors, Brightness, Theory.

Determinations were made of the color induced into a neutral field of light by brief surround-colors (red, yellow, green, or blue) which either preceded, were synchronous with, or followed, the neutral field. The amount of induced color was measured by comparison with an actual field of colored light which could be varied in hue, saturation, and brightness. The saturation of color induced by blue and green surrounds was greatest when the onset of the surround followed that of the neutral field; for red and yellow, the pattern varied with the individual. Maximum loss of brightness was always at negative temporal intervals. The data support a theory of color induction as a process of simple desensitization by lateral adaptation, assuming the blue color mechanism has a larger receptive field than any other color mechanism. (Author)
AD-653 806 Not available from CFSTI.

ANTIBODY PLAQUE-FORMING CELLS IN UNSENSITIZED MICE: SPECIFICITY AND RESPONSE TO NEONATAL THYMECTOMY, X IRRADIATION AND PHA,
Naval Radiological Defense Lab San Francisco Calif
John S. Hege, and Leonard J. Cole. 3 Jul 67, 33p
Rept no. USNRDL-TR-67-47
NAVMED-MR005.08-0006

Descriptors: (*Antigen-antibody reactions, Whole body irradiation), Antigens + antibodies, Biosynthesis, Hemolysis, Thymus, Excision, X rays, Immune serums, Agglutinins, Mice, Spleen.

Using the standard antibody plaque technique, numbers of background anti-sheep erythrocyte plaque-forming cells (PFC's) in spleens of unsensitized mice have been determined after neonatal thymectomy, after whole body X irradiation and after injection of phytohemagglutinin-M or typhoid paratyphoid vaccine. The results show that numbers of background PFC's are not affected by neonatal thymectomy or by whole body X irradiation at dose levels known to inhibit cellular proliferation, but that they are significantly increased (10-20 fold) by phytohemagglutinin, typhoid vaccine and other unrelated antigens. Simultaneous determinations of background anti-sheep erythrocyte and anti-horse erythrocyte PFC's indicate that these two populations are independent of one another. From these and other studies it is concluded that background PFC's (1) produce specific hemolysin, (2) are thymus independent, (3) are relatively long lived (average life time > 7 days), (4) are not related to the antigen sensitive precursors of the primary response PFC's. (Author)
AD-653 864 HC$3.00 MF$0.65

THE EFFECT OF ATRIAL SYSTOLE ON RIGHT VENTRICULAR STROKE OUTPUT IN MAN.
Final rept., Jul 65-Jul 66,
Oxford Univ (England)
W. J. Gillespie, D. G. Greene, N. B. Karatzas, and G. de J. Lee. Apr 67, 20p
SAM-TR-67-25
Contract AF 61 (052)-746

Descriptors: (*Cardiovascular diseases, *Blood pressure), Arrhythmia, Respiration, Blood circulation, Heart, Diseases, Physiology, Capillaries, Cardiovascular system, Measurement, Nitrogen oxides, Great Britain.
Identifiers: Stroke volume (Heart), Plethysmography.

The effect of correct synchrony between atrial and ventricular contraction in achieving optimal stroke output by the heart is not clearly defined in man because of the lack of an accurate method for measuring beat-by-beat changes in stroke volume. We have therefore made such measurements using the N2O-plethysmograph method for recording instantaneous pulmonary capillary blood flow. Integration of the N2O pulsations permits beat-by-beat measurements of right ventricular stroke volume. Two model groups of subjects were studied whose ventricular rates were constant but in whom the P-R interval varied widely; group A, healthy subjects with congenital complete atrioventricular dissociation; and group B, patients with complete atrioventricular dissociation due to myocardial disease. In group A, 40% augmentation in stroke output by the heart took place when the P-R interval was optimally timed late in ventricular diastole. In group B, atrioventricular synergy produced only 13% augmentation. Changes in pulmonary venous compliance due to elevation of the left atrial pressure in the group B subjects with myocardial disease led to major alterations in lung capillary blood flow as a consequence of the changes in pulmonary venous outflow impedance so imposed. (Author)
AD-653 939 HC$3.00 MF$0.65

EYE EFFECTS MATHEMATICAL MODELS.
Final rept., 1 Jun 66-31 May 67,
Technology Inc San Antonio Tex Life Sciences Div
A. F. Muller, and P. W. Wilson, Jr. Jun 67, 23p
Contract AF 41 (609)-3079
Supported by School of Aerospace Medicine, Brooks AFB, Tex. Dept. of Ophthalmology.

Descriptors: (*Mathematical models, *Eye), Differential equations, Retina, Flashblindness, Stability, Nuclear radiation, Burns, Temperature, Partial differential equations, Mathematical analysis.

The report describes the results of research to develop mathematical models of eye effects produced by nuclear flashes. The model for prediction of retinal burns gives temperature values by using a numerical method to approximate the solution of a differential equation governing the conduction of heat in the ocular fundus. Consideration is given to the validity of the solution by discussing the convergence, stability, and accuracy of the numerical method. Comments are given on a statistical model for the prediction of flashblindness recovery times. (Author)
AD-653 984 HC$3.00 MF$0.65

STUDIES WITH RATS I. BRAIN MECHANISM IN FEAR SUPPRESSION. II. COMPLEXITY AND STIMULUS CHOICE. III. ACQUISITION LATENCY AND EXCITATION IN CLASSICAL CONDITIONING.
Florida Presbyterian Coll St Petersburg Neuro-Sciences Lab
For primary bibliographic entry see Field 5J.
AD-654 006 HC$3.00 MF$0.65

NUTRITIONAL REQUIREMENTS OF ENTEROTOXIGENIC STRAINS OF STAPHYLOCOCCUS AUREUS.
North Carolina Univ Chapel Hill Dept of Environmental Sciences and Engineering
For primary bibliographic entry see Field 6M.
AD-654 031 HC$3.00 MF$0.65

SOME PROPERTIES OF RAT ERYTHROCYTES AFTER SPLENECTOMY AND WITH REIMPLANTED SPLEENS,

Walter Reed Army Inst of Research Washington D C
Egmond E. Rieber, Charles E. Shields, Marcel E. Conrad, and William H. Crosby. 9 Aug 66, 4p
Availability: Published in American Journal of Physiology v212 n4 p897-900 Apr 1967.

Descriptors: (*Spleen, Transplantation), (*Transplantation, Hemolysis), Erythrocytes, Osmosis, Diagnosis, Hematology, Implants, Regeneration.

Normal, asplenic, and splenectomized rats with reimplanted spleens were studied for erythrocytic abnormalities 1 year after surgery. The cumulative weight of splenic implants was about 40% of the normal expected weight of the organ. Splenic implantation prevented measurable leptocytosis and accumulation of Howell-Jolly bodies in the peripheral blood but failed to correct abnormalities in osmotic fragility tests. This suggested that various splenic functions require different amounts of splenic tissue and that abnormalities in osmotic fragility tests are a sensitive indicator of decreased functional splenic tissue. (Author)
AD-654 081 Not available from CFSTI.

GASTRECTOMY AND IRON ABSORPTION: EFFECTS OF BLEEDING, IRON LOADING AND ASCORBIC ACID IN RATS,
Walter Reed Army Inst of Research Washington D C
For primary bibliographic entry see Field 6E.
AD-654 085 Not available from CFSTI.

CHEMOSENSITIVE RECEPTOR IN THE ADRENAL GLAND,
Walter Reed Army Inst of Research Washington D C
A. Niijima, and D. L. Winter. 1967, 1p
Availability: Published in Federation Proceedings v26 n2 Mar-Apr 1967.

Descriptors: (*Adrenal glands, *Chemoreceptors), Epinephrine, Levarterenol, Electrophysiology, Blood pressure, Nerves, Rabbits.

Unitary recordings were made from dissected fillaments of the direct nerve branch to the adrenal gland in the anesthetized rabbit. Receptors responding to different types of stimuli were found. The following evidence suggest that one of these is a chemosensitive receptor. Chemosensitive receptors were tonically active and showed a decreased firing rate (sometimes to 0) following systemic I.V. injections of adrenalin and/or noradrenalin (10-30 micrograms). This depression lasted from 15-60 seconds in different preparations before the firing rate gradually returned to control levels. Following electrical stimulation of the peripheral cut stump of the splanchnic nerve, the firing rate was depressed in a similar manner. Elevation of the blood pressure by mechanical means did not alter the firing rate of these receptors. (Author)
AD-654 104 Not available from CFSTI.

EGOCENTRIC VISUAL LOCALIZATION IN NORMALS AND PARTIALLY BLIND DURING A CHANGE IN DIRECTION OF GRAVITOINERTIAL FORCE.
Joint rept.,
Naval Aerospace Medical Inst Pensacola Fla
Brant Clark, and Ashton Graybiel. 2 May 67, 13p
Rept no. NAMI-1006
NAVMED-MR005.04-0021.147
NASA Order R-93

Descriptors: (*Blindness, *Space perception), Vestibular apparatus, Visual perception, Visual acuity, Gravity, Illusions.

The purpose of this experiment was to compare the interactions of visual and nonvisual information during the perception of the visual horizontal in twelve normal and seven partially blind observers during exposure to centripetal force. Both the normal and the partially blind observers had normal vestibular functions. The observers set a collimated, luminous line to the horizon in darkness while they sat in a cockpit 20 feet from the center of rotation. Settings were made with the device stationary and during rotation at three velocities. The results show negligible differences between the normals and the partially blind for all conditions. Both groups showed minimal errors during the static series both before and after rotation and during rotation the settings were very close to the resultant horizontal. It was concluded that interaction between visual and nonvisual information is possible with extremely limited central vision. (Author)
AD-654 170 HC$3.00 MF$0.65

6Q. PROTECTIVE EQUIPMENT

AUXILIARY HEATED HANDWEAR FOR ARCTIC MAINTENANCE PERSONNEL.
Rept. for Nov 64-Dec 65,
Arctic Aeromedical Lab Fort Wainwright Alaska
John F. Roy. Mar 67, 13p Rept no. AAL-TR-67-1

Descriptors: (*Gloves, *Arctic regions), (*Maintenance personnel, Gloves), Batteries + components, Heating, Maneuverability, Cold weather tests.

Electrically heated gloves were developed to protect maintenance personnel in severe cold, allow manual dexterity and be powered by rechargeable lightweight batteries. Tests with such gloves to -45F disclosed that 15 watts per hand applied intermittently was sufficient to keep hands warm in the most severe conditions. Manual dexterity tests in the cold showed that for most tasks ordinarily performed by maintenance personnel, the electrically heated gloves used would still have to be removed. Because of this limitation and the high weight to power ratios of batteries currently available, it was determined that the practical value of systems that could be developed did not warrant further pursuit of auxiliary heated development at this time. (Author)
AD-653 532 HC$3.00 MF$0.65

DEVELOPMENT OF EAR PROTECTOR, ELECTROACOUSTIC MX-7307 ( ) / UIC.
Quarterly rept. no. 1, 23 Nov 66-28 Feb 67,
CBS Labs Stamford Conn
John R. Pavlick, and Emil L. Torick. Mar 67, 8p
ECOM-0053-1
Contract DAAB07-67-C-0053

Descriptors: (*Ear protectors, Blast), Armored vehicles, Intercommunication systems, Acoustic equipment.

The report contains a summary of the work performed for the design and construction of an Ear Protector, Electroacoustic to be used with Intercommunication Set AN/VIC-1 when installed in armored vehicles provided with electrically fired weapons. The Ear Protector provides a pulsed tone into the crewmen's ears prior to the firing of the weapon, which protectively conditions the ears against the injurious blasts of the fired weapon. (Author)
AD-653 794 HC$3.00 MF$0.65

6R. RADIOBIOLOGY

SEMIANNUAL REPORT TO THE ATOMIC ENERGY COMMISSION,
Argonne Cancer Research Hospital, Chicago, Ill.
Leon O. Jacobson. Sep 66, 135p
Contract AT (11-1)-69

Descriptors: (*Cancer, *Medical research), (*Radiobiology, *Chromosomes), In vitro analysis, Laboratory animals, Cells (Biology).

For abstract, see NSA 21 13.
ACRH-26 HC$3.00 MF$0.65

FEASIBILITY AND POTENTIAL EFFECTIVENESS OF PARTIAL-BODY SHIELDING FOR PERSONNEL PROTECTION AGAINST IONIZING RADIATION,
Naval Radiological Defense Lab San Francisco Calif
Edwin S. Shapiro. 11 Apr 67, 66p Rept no. USNRDL-TR-67-39

Descriptors: (*Partial body irradiation, *Radiobiology), (*Radioactive fallout, *Shielding), Body armor, Feasibility studies, Radiation effects, Protective clothing, Radioprotective agents, Radiological dosage, Nuclear radiation, Weight, Efficiency, Radiation hazards, Performance (Human), Radiological dosage.

The feasibility of partial-body shielding is discussed from two points of view. The first assumes that limited clinical and experimental data are extrapolable to the operational situations of interest and that it is possible to selectively protect against the neural, hemapoietic, and gastrointestinal components of the acute radiation syndrome. Under this assumption, it would appear that (a) neural syndrome symptomatology may be adequately controlled by means of drugs, (b) the hemapoietic syndrome may be controlled by a light-weight (under 10 lbs) lead epicondylar cuff, and (c) in many operational situations the gastrointinal syndrome may be controlled by an abdominal shield sufficiently light in weight to permit postattack personnel to efficiently perform their tasks. The second point of view discussed assumes that, at present, there is not an adequate basis for selective syndrome shielding, and that a metal shield covering all of the body from the hips to the neck is the only adequate form of protection. Under this assumption it would appear that weight limitations preclude the use of this type of shield in most situations in which personnel must enter the fallout field at specified times and remain until the completion of their mission. However, in the case of personnel who are not required to enter the field at any specified time and who may be recalled after receiving a predetermined dose, trunk shields of acceptable weights will significantly lower entry times and extend stay times. The use of a grid (sieve) trunk shield is discussed and it appears that a shield of this type, of acceptable weight, may be of benefit in many operational situations in which the solid shield was not.
AD-653 459 HC$3.00 MF$0.65

FUNCTION OF MAMMALIAN RETINA DURING X-IRRADIATION.
Final rept., 1 Jun 65-1 Dec 66,
Florida Univ Gainesville Coll of Medicine
William W. Dawson. 29 Feb 67, 33p
Contract DA-49-193-MD-2733

Descriptors: (*Radiation effects, *Retina), X rays, Radiological dosage, Eye, Eye pigments, Photoreceptors, Thresholds (Physiology), Mammals, Electroretinography, Vision, Adaptation (Physiology), Electrophysiology, Nervous system.

The electrical potentials elicited by light and low-dose X-irradiation were measured within the vitreous body of the eyes of rabbits. Nerve block agents and pharmacological degeneration of the visual receptors support the conclusion that although the eye is excited by X-rays the excitation does not occur at the site (s) responsible for light reception. The results are consistant with neural interaction effects, specifically, interactions with the lateral inhibitory system which encodes retinal information and increases the sharpness of figure-ground relationships. These findings are inconsistant with photopigment bleaching by X-rays which has been suggested as the basis for visual excitation by ionizing rays of all energies. (Author)
AD-653 848 HC$3.00 MF$0.65

Group 6R — Radiobiology

ANTIBODY PLAQUE-FORMING CELLS IN UNSENSITIZED MICE: SPECIFICITY AND RESPONSE TO NEONATAL THYMECTOMY, X IRRADIATION AND PHA,
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 6P.
AD-653 864 HC$3.00 MF$0.65

DETERMINATION OF ACHROMATIC VISUAL THRESHOLDS IN MAN FOLLOWING EXPOSURE TO ULTRASHORT, ULTRAVIOLET AND ROENTGEN WAVES.
Technical translation,
School of Aerospace Medicine Brooks AFB Tex
K. Kh. Kekcheev. 1967, 7p Rept no. SAM-TT-880-0367
TT-60-13098
Ob Izmerenii Perogov Akhromaticheskogo Zreniya Cheloveka pri Deistvii Ultrakorotkikh, Ultrafioletovykh i Rentgenovykh voln, trans. of Problemy Fiziologicheskoi Optiki (USSR), v1 p77 1941.

Descriptors: (*Vision, Adaptation (Physiology)), (*Radiation effects, Vision), Sensitivity, Radiological dosage, Ultraviolet radiation, Thresholds (Physiology), Retina, Photoreceptors, Autonomic nervous system, Electromagnetic waves, Spectra (Visible + ultraviolet), USSR.

A series of experiments was carried out using short electromagnetic waves, exposing wrists to small amounts of x-rays (30-100 r). It is known that erythema usually appears on the sixth day after a dose of 600 r. However, changes in the visual threshold were noted one day after exposure to doses that were 6 to 20 times smaller (100-30 r) than the dose causing erythema. These changes were observed for several days. During the 'blind tests' all conditions were the same with one exception: a thick lead shield was placed between the patient and the source of radiation. In this manner, x-ray wave lengths from 1 x 10 to the minus 7th power to 1 x 10 to the minus 8th power cm (millimicrons and tenths of millimicrons) have, in either case, an effect on the autonomic nervous system. The experiments were continued using long electromagnetic waves rather than those of the visible spectrum. The experiment consisted of 47 tests on seven subjects. Control experiments (heat applied on abdomen and back) showed no changes. Ultrashort waves showed a marked effect on the visual threshold within a few hours. Separate tests were carried out also with short waves (length of waves approximately 50 meters) with equally valuable results. The experiments indicate that the autonomic nervous system of man is effected by a very large spread of electromagnetic wave lengths.
AD-653 949 HC$3.00 MF$0.65

ANNUAL REPORT FOR 1965 IN THE PHYSICAL SCIENCES. VOLUME 2. RADIOLOGICAL SCIENCES,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 21 13.
BNWL-235-2 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

FALLOUT PROGRAM QUARTERLY SUMMARY REPORT DECEMBER 1, 1966-MARCH 1, 1967, APPENDIX.
New York Operations Office (AEC), N. Y. Health and Safety Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
HASL-181 HC$3.00 MF$0.65

DESIGN AND FABRICATION OF A PHOTOTYPE LAMINATED URANIUM METAL SHIPPING CASK FOR LARGE SHIPMENTS OF CO,
Paducah Gaseous Diffusion Plant, Ky.
C. B. Clifford. 3 Apr 67, 38p
Contract W-7405-eng-26

Descriptors: (*Containers, Shielding), (*Radioactive waste, Transportation), Cobalt, Laminates, Uranium, Metal plates, Heat transfer, Heat treatment.

For abstract, see NSA 21 13.
KY-521 HC$3.00 MF$0.65

ENVIRONMENTAL MONITORING REPORT JULY-DECEMBER 1966, AND 1966 SUMMARY,
Mound Lab., Miamisburg, Ohio.
H. F. Anderson, and W. E. Sheehan. 10 Feb 67, 23p
Contract AT (33-1)-GEN-53

Descriptors: (*Radiation monitors, *Radiobiology), (*Environmental tests, Radioactivity), Radioactive waste disposal, Health physics instrumentation.

For abstract, see NSA 21 13.
MLM-1391 HC$3.00 MF$0.65

EPIDEMIOLOGICAL FOLLOW-UP OF THE NEW JERSEY RADIUM CASES. I. REPORT OF THE EPIDEMIOLOGICAL AND MEDICAL STUDY GROUP AND THE PROJECT SUBCONTRACTORS. II. RESUME OF COOPERATIVE LABORATORY STUDIES ON PROJECT CASES AND SPECIMENS. III. RESUMES OF FINDINGS FROM INDIVIDUAL CASE STUDIES.
New Jersey State Dept. Of Health, West Orange. Radium Research Project.
For primary bibliographic entry see Field 14B.
For abstract, see NSA 21 13.
NYO-2181-4 HC$3.00 MF$0.65

INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE-8.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
ORNL-NSIC-32 HC$3.00 MF$0.65

COMPREHENSIVE REPORT OF THE CLINCH RIVER STUDY,
Oak Ridge National Lab., Tenn.
E. G. Struxness, P. H. Carrigan, Jr., M. A. Churchill, and D. J. Nelson. Apr 67, 126p
Contract W-7405-eng-26

Descriptors: (*Radioactive waste, *Health physics), (*Radiobiology, Wastes (Industrial)), Radiation monitors, Water pollution, Radioactivity, Irrigation systems, Fishes.

For abstract, see NSA 21 13.
ORNL-4035 HC$3.00 MF$0.65

BEHAVIOR OF IODINE IN AIR A RESUME OF THE FIRST SEVEN RUNS CONDUCTED AT THE NUCLEAR SAFETY PILOT PLANT,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18G.
For abstract, see NSA 21 13.
ORNL-4050 HC$3.00 MF$0.65

6S. STRESS PHYSIOLOGY

CHANGES IN THE ELECTROGASTROGRAM AND IN BREATHING AMPLITUDE AS INDICATORS OF NAUSEA.
Technical rept.,
Indiana Univ Bloomington
Michael M. Patterson. Jun 67, 19p Rept no. TR-18
Contract Nonr-908 (15)

Descriptors: (*Motion sickness, Gastrointestinal system), (*Emesis, Gastrointestinal system), Psychophysiology, Muscles, Relaxation (Physiology), Respiration, Peristalsis, Semicircular canals, Proprioception, Vestibular apparatus, Stress (Physiology), Central nervous system, Electrophysiology, Recording systems, Sensation (Physiology), Etiology, Autonomic nervous system.

From 35 human males subjected to Coriolis stimulation, the 12 Ss who reported feelings of nausea showed a significantly greater d.c. potential drift from the gastrointestinal (g.i.) area, recorded by the Davis method, and a larger respiration amplitude than those Ss who did not report such feelings. The results suggest that the measures of drift and breathing amplitude might be used as indicators of nausea. The fact that Crampton's (1955) intragastric recordings showed no such relation is discussed, and differences between his and the present experiments are analyzed. The results are interpreted as supporting the validity of the Davis method for recording g.i. activity in research of the present kind. (Author)
AD-653 462 HC$3.00 MF$0.65

VISUAL ILLUSIONS AND AIRCRAFT ACCIDENTS.
Final rept., Oct 64-Sep 65,
School of Aerospace Medicine Brooks AFB Tex
Donald G. Pitts. Apr 67, 39p Rept no. SAM-TR-67-28

Descriptors: (*Vision, Illusions), (*Aviation accidents, Illusions), Ophthalmology, Aviation medicine, Vestibular apparatus, Space perception, Pilots, Decision making, Stress (Psychology), Training.

The visual system and vestibular system interact to form a complex relationship in certain flying situations which results in spatial disorientation. The severity of the problem depends on how the pilot decides to utilize sensory information to control the aircraft. A correct decision results in adequate control of the aircraft, whereas an incorrect decision may prove fatal. The autokinetic, oculogyral, oculogravic, and Coriolis illusions are discussed; proposed research is outlined; and recommendations are given for minimizing the effects of illusions on the pilot. Perspective and motion parallax afford the most consistent visual information from which the pilot formulates his judgement of distance. Distance perception is the result of an integration of all visual cues with past experience, and any change in glide slope, external terrain, aircraft speed, and awareness may result in significant distance judgment errors. Reduction in impinging external stimuli by darkness, inclement weather, and emotional stress factors greatly accentuate the pilot's susceptibility to illusions. Thus, these conditions require special training and instrument discipline to insure safe flying, approaches, and landings. (Author)
AD-653 518 HC$3.00 MF$0.65

SPEECH IN AN ARTIFICIAL ATMOSPHERE (44% OXYGEN-56% HELIUM).
Aerospace Medical Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 17B.
AD-653 519 HC$3.00 MF$0.65

CONTINUOUS EKG RECORDING DURING FREE-FALL PARACHUTING,
Army Aeromedical Research Unit Fort Rucker Ala
W. P. Schane, and Kenneth E. Slinde. Jun 67, 32p Rept no. USAARU-67-7

Descriptors: (*Parachute jumping, Electrocardiography), Stress (Physiology), Pulse rate, Heart, Responses.

An attempt was made to determine heart rate and rhythm of experienced parachutists during free-fall and during the periods immediately before and after the jumps. Continuous EKG recordings were made of 29 experienced parachutists while each participated in free-fall parachuting exercises. A total of 98 individual exits from aircraft in flight were recorded. Mean R-R interval was 0.403 seconds just prior to exit from the aircraft, 0.363 seconds during free-fall, 0.336 seconds immediately after parachute opening, 0.369 at landing, and 0.465 5 minutes after landing. Although there was variation in the R-R interval among individuals, the progressive decrease of R-R interval throughout the exit and free-fall with a nadir at parachute opening, was the common thing. There is marked individual difference in the duration of tachycardia before and after jumps. Over the entire group, mean duration per subject was 19.4 minutes of tachycardia prior to exit, and 30.4 minutes of tachycardia after parachute opening. In the individuals who made at least 2 jumps on any one day, the R-R interval measured on a single individual on the first and second jumps were remarkably similar, and within the group not statistically different. A correlation matrix was computed to show relationships between various parameters studied. The correlation between R-R interval and total number of jumps was opposite in direction to that which was expected, and nearly attained values that were statistically significant. (Author)
AD-653 598 HC$3.00 MF$0.65

INTERACTION OF CHRONIC COLD EXPOSURE AND PHYSICAL TRAINING UPON HUMAN BODILY TOLERANCE TO COLD.
Final rept.,
Oslo Univ (Norway) Inst of Work Physiology
K. Lange Andersen. 31 Aug 64, 103p
Contract AF 61 (052)-758

Descriptors: (*Heat production (Biology), *Acclimatization), Tolerances (Physiology), Exposure, Physical fitness, Training, Stress (Physiology), Diet, Nutrition, Metabolism, Responses, Sleep, Muscles, Blood circulation, Body temperature, Blood pressure, Sensation (Physiology), Norway.
Identifiers: Cold tolerance.

Contents: Review of relevant literature; Objectives of the study; Physical training and its effect upon health and physiological indices of physical fitness; Cold exposure; Diet and caloric balance; Effect upon cold tolerance; Thermal and metabolic responses during a night of exposure to warm and to moderate cold; Sleep and muscle activity during general body cooling; Aspects of peripheral circulation; Pressor reaction to severe appendage cooling.
AD-653 645 HC$3.00 MF$0.65

ADAPTATION TO VESTIBULAR DISORIENTATION. IV. RESPONSES TO ANGULAR ACCELERATION AND TO BILATERAL CALORIC STIMULATION FOLLOWING UNILATERAL CALORIC HABITUATION,
Civil Aeromedical Inst Oklahoma City Okla
Ruth Ann Mertens, and William E. Collins. Jan 67, 19p
FAA-AM-67-2

Descriptors: (*Acceleration, Adaptation (Physiology)), (*Vestibular apparatus, *Habituation learning), Nystagmus, Vertigo, Stimulation, Responses, Rotation, Aviation medicine.

The paper provides information that angular acceleration tests of the vestibular system transcend clinical caloric tests in revealing adaptation to angular accelerations as experienced in rotary motions, including flight situations. The caloric test is definitely not a substitute for angular acceleration tests. The vestibular system is the system primarily involved in disorientation and vertigo. Adaptation of vestibular responses was obtained by clinical methods (unilateral calorization) and the generalization of this state of adaptation to bilateral (caloric and rotatory) stimulation was examined. Data indicate positive transfer effects for the clinical stimuli but no clear transfer of adaptation occurred with respect to responses elicited by angular accelerations. Further, adaptation of nystagmus by repeated angular accelerations failed to transfer to clinical stimulation. Differences in modes of activation between methods and influences related to stimulation of the gravity receptor were cited as possible causes for the lack of transfer. A subject's state of adaptation to angular accelerations may not be adequately assessed by clinical caloric tests. (Author)
AD-653 696 HC$3.00 MF$0.65

FATIGUE AND STRESS STUDIES: AN IMPROVED SEMI-AUTOMATED PROCEDURE FOR FLUOROMETRIC DETERMINATION OF PLASMA CATECHOLAMINES,
Civil Aeromedical Inst Oklahoma City Okla
For primary bibliographic entry see Field 6A.
AD-653 748 HC$3.00 MF$0.65

STUDIES OF THE PERFORMANCE CAPABILITIES OF DIVERS: THE EFFECTS OF COLD.
Technical rept.,
Dunlap and Associates Inc Darien Conn
Hugh M. Bowen, and Richard D. Pepler. Mar 67, 59p Rept no. SSD67-399
Contracts N00014-67-C-0263, Nonr-4986 (00)

Descriptors: (*Diving, Stress (Physiology)), Performance (Human), Touch, Sensitivity, Motion, Reasoning, Problem solving, Memory, Attention, Motor reactions, Underwater.
Identifiers: Cold tolerance.

The study examines the performance capabilities of divers. Trials were conducted at various water temperatures to assess the effects of cold. Dry land trials provided control performance scores. The capabilities tested were; tactile sensitivity, manual dexterity, manual movement, reasoning (arithmetic), problem solving, memory, and a multi-task capability requiring simultaneous manual tracking and attention to an audio channel. The data indicates that diving in warm water causes loss in motor functions due, it is thought, to the changes and hindrances experienced in the diving condition. Diving in cold water increases the motor loss and causes distraction and disruption in mental tasks; 'blocking' in attention and lowered memory capability were found. Impairment of performance on the multi-task was considerable. It is hypothesized that cold water stress, in addition to causing specific sensory and motor losses, causes increasing losses of capability as the task becomes more complex and is more dependent on sustained attention and memory functions. (Author)
AD-653 755 HC$3.00 MF$0.65

A DETAILED STUDY OF CONTAMINANTS PRODUCED BY MAN IN A SPACE CABIN SIMULATOR AT 760 MM. HG.
Final rept., 2-29 Jun 65,
School of Aerospace Medicine Brooks AFB Tex
J. P. Conkle, W. E. Mabson, J. D. Adams, H. J. Zeft, and B. E. Welch. Mar 67, 149p Rept no. SAM-TR-67-16
NASA Order R-89

Descriptors: (*Closed ecological systems, Contamination), (*Spacecraft cabins, Contamination), Humans, Confined environments, Environmental tests, Space simulation chambers, Manned, Chemical compounds, Gas chromatography, Infrared spectroscopy, Mass spectroscopy, Carbon monoxide, Carbon dioxide, Decontamination, Cryogenics, Space medicine.

A 27-day experiment was conducted to determine man's contribution to trace contaminants in a sealed environment. An environmental test cell was maintained at a total pressure of 760 mm. Hg throughout the 27 days, with the first 13 days being unmanned and the last 14 days being manned. Four subjects were utilized during the 14-day manned portion of the test. During the 27 days, 97 compounds were identified and quantified; 21 of these compounds were noted only during the manned portion of the study. Direct contaminant analysis of the sealed environment was not adequate for this type of comprehensive survey. Cryogenic fractionation and concentration, however, provided samples with sufficient concentration of contaminants for analysis by means of gas chromatography, infrared spectroscopy and mass spectroscopy. Carbon monoxide and carbon dioxide were compounds that were produced by man and identified in this experiment and that would require removal during the 14-day period. (Author)
AD-653 932 HC$3.00 MF$0.65

INDIRECT CALORIMETRY IN LOW PRESSURE ENVIRONMENTS.
Rept. for Jan-Jul 66,
School of Aerospace Medicine Brooks AFB Tex
Michael J. Ryan, and Stephen M. Cain. Mar 67, 13p Rept no. SAM-TR-67-27

Descriptors: (*Oxygen consumption, Calorimetry), Space medicine, Respiration, Calibration, Meters, Low-pressure research, Ventilation, Carbon dioxide, Oxygen, Gas analysis.

Equipment to measure energy exchange in low pressure environments was evaluated. A volume-summing apparatus with a proportional gas sampler, the Muller-Franz gas meter, proved to be reliable at barometric pressures of 447 and 259 torr (equivalent to 14,000 and 27,000 feet) for the measurement of minute volume of ventilation, oxygen uptake, and CO_2 production. (Author)
AD-653 934 HC$3.00 MF$0.65

STUDIES OF PILOT PERFORMANCE IN HELICOPTERS.
Progress rept.,
Ohio State Univ Research Foundation Columbus
Charles E. Billings. Jun 67, 64p
Contract DA-49-193-MD-2615

Descriptors: (*Pilots, Performance (Human)), (*Helicopters, Pilots), Stress (Physiology), Stress (Psychology), Flight, Low altitude, Fatigue (Physiology), Psychophysiology, Training.

The report describes changes in piloting performance observed during four hours of very low altitude flight in helicopters. In the course of these missions, designed to produce fatigue, pilots tended to allow rotor RPM to vary within wider limits as flight time increased. Control movements of relatively large amplitude increased considerably during the later hours of flight. These changes were evident both during flight in immediate proximity to obstructions and during flight of a less stressful nature. Significant differences among the four pilots studied appeared to be related both to previous helicopter flight experience and to the type of equipment flown prior to the experiment. A validation study was made of the measurement techniques developed in the first phase of the project. Using modified data collection techniques, fixed wing pilots are being studied during 25 hours of flight instruction in helicopters. Both psychological (performance) variables and physiological

functions are being monitored with the hope of observing correlations between them. Improvements in data acquisition and processing techniques are described. (Author)
AD-654 045 HC$3.00 MF$0.65

THE EFFECTS OF DEHYDRATION ON THE AEROBIC AND ANAEROBIC CAPACITIES OF MEN, PART IV FINAL SCIENTIFIC REPORT.
Indiana Univ., Bloomington. Dept. of Anatomy and Physiology.
J. L. Newton, S. Robinson, and B. Sadowski. 31 Dec 66, 12p NASA-CR-84654
Grant NSG-408

Descriptors: *Dehydration, *Work capacity, Aerobe, Anaerobe, Blood, Body, Capacity, Energy, Exhaustion, Lactate, Metabolism, Oxygen, Recovery, Regulation, Run, Temperature, Treadmill, Weight, Work.

For abstract, see STAR 05 15.
N67-28008 HC$3.00 MF$0.65

6T. TOXICOLOGY

PATHOLOGY OF OXYGEN TOXICITY IN FORTY MACACA MULATTA.
Aerospace Medical Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 6E.
AD-653 526 HC$3.00 MF$0.65

THE TOXICOLOGICAL CHARACTERISTIC OF HYDRAZINE,
Foreign Technology Div Wright-Patterson AFB Ohio
N. K. Kulagina. 20 Jan 67, 26p Rept no. FTD-HT-66-306
TT-67-62116
Toksikologicheskaya Kharakteristika Gidrazina, edited trans. of Toksikologiya Novykh Promyshlennykh Khimicheskikh Veshchestv (USSR) n4 p65-81 1962.

Descriptors: (*Hydrazine, Toxicity), Industrial medicine, Poisoning, Thresholds (Physiology), Central nervous system, Respiratory system, Morphology (Biology), Pathology, Blood vessels, Lungs, Protection, Eye, Skin, Liver, Kidneys, Edema, Necrosis, Hemoglobin, Penetration, Membranes (Biology), Mucus, Convulsive disorders, USSR.

Lethal concentrations of hydrazine vapors are of the order of 1.0 to 2.0 mg/liter. Concentrations of the order of 0.5 to 0.8 mg/liter are abreactive though they result in pronounced disturbances. A threshold concentration of hydrazine which produces minimal disturbances of the higher nervous activity of animals with a one-time application is a concentration of 0.02 mg/liter. It produces an increased irritability of the central nervous system. The clinical picture of acute hydrazine poisoning includes an irritating effect upon the mucuous membranes of the eyes, upper respiratory tracts and a general excitation, sometimes accompanied by convulsions. The morphological changes of the inner organs include extensive vascular disturbances, lung edema, and necrobiotic changes of the liver and kidneys. Prolonged exposure to hydrazine vapors in small concentrations may cause a chronic poisoning. The capability of hydrazine to penetrate the body through the skin and to produce a heavy and even lethal poisoning, as well as its capability to cause an acute skin irritation, and of the mucuous emembranes of the eye make it necessary to protect the skin and eyes from direct contact with hydrazine.
AD-653 546 HC$3.00 MF$0.65

THE SUBSTITUTION OF 1-METHYLHYDRAZINE FOR AMMONIA IN THE GLUTAMINE SYNTHETASE SYSTEM,
School of Aerospace Medicine Brooks AFB Tex
For primary bibliographic entry see Field 6A.
AD-653 685 Not available from CFSTI.

FLUORINE TOXICITY STUDIES STATUS PROGRESS REPORT.
Miami Univ., Fla. Research and Teaching Center of Toxicology.
M. L. Keplinger. 1 Dec 66, 14p NASA-CR-84659
Contract NGR 10-007-012

Descriptors: *Fluorine, *Inhalation, *Kidney, *Toxicity, Age, Animal, Concentration, Damage, Edema, Eye, Human, Irritation, Lung, Nose, Study.

For abstract, see STAR 05 15.
N67-28013 HC$3.00 MF$0.65

PRECLINICAL TOXICOLOGY OF NSC 526051 IN MICE, RATS, GUINEA PIGS, RABBITS AND DOGS.
Little (Arthur D.), Inc., Cambridge, Mass.
For primary bibliographic entry see Field 6O.
PB-174 865 HC$3.00 MF$0.65

THE LD50 OF METHOTREXATE (NSC-740) BY THE ORAL ROUTE IN UNILATERALLY NEPHRECTOMIZED, SHAM OPERATED AND NORMAL MICE.
Mason Research Inst., Worcester, Mass.
For primary bibliographic entry see Field 6O.
PB-174 869 HC$3.00 MF$0.65

6U. WEAPON EFFECTS

ANALYSIS OF JAPANESE NUCLEAR CASUALTY DATA.
Dikewood Corp Albuquerque N Mex
For primary bibliographic entry see Field 18C.
AD-653 922 HC$3.00 MF$0.65

7. CHEMISTRY

7A. CHEMICAL ENGINEERING

REDUCTION OF THE CALCITE CONTENT OF GROUND SHALE BY LIQUID-LIQUID PARTICLE TRANSFER,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
R. D. Coleman, J. P. Sutherland, and C. E. Capes. 15 Sep 66, 3p
NRC-9509
Availability: Published in Journal of Applied Chemistry v17 p89-90 Apr 1967.

Descriptors: (*Shale, Purification), (*Calcite, Removal), Adsorption, Particles, Mass transfer, Colloids, Oils, Fuels, Canada.

The removal of calcite from a naturally occurring shale is described. The technique used involves making the calcite particles hydrophobic by ballmilling the shale in aqueous suspension in the presence of sodium oleate conditioner. The calcite particles are then selectively absorbed by a viscous petroleum oil which is brought into contact with the suspension. Calcite removal was improved by increasing conditioner concentration, time of grinding and oil/suspension contact time. Some of the advantages and disadvantages of the process are pointed out. (Author)
AD-653 417 Not available from CFSTI.

A PATENT SEARCH FOR MOVING BEDS FOR ABSORPTION, TO CLEAN AIR.
Naval Ship Research and Development Center Annapolis Md Annapolis Div
For primary bibliographic entry see Field 6K.
AD-653 461 HC$3.00 MF$0.65

CHEMICAL AND CHEMICAL TECHNOLOGY, VOL. 16 PART II, 1963, TRANSACTIONS: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
23 Dec 66, 25p Rept no. FTD-HT-66-373
TT-67-62093
Unedited rough draft trans. of Khimiko-Tekhnologicheskii Institut, Dnepropetrovsk. Trudy (USSR) v16 pt2 p181-8, 193-201 1963.

Descriptors: (*Bearings, *Corrosive liquids), (*Welds, Chemical analysis), Friction, Metals, Wear resistance, Lubrication, Test equipment, Corrosion, Hardness, Sulfuric acid, Joints, Mechanical properties, Molybdenum alloys, Aluminum alloys, Cooling, USSR.

Contents: Modern methods of investigating liquid friction bearings working in aggressive media; Determining the mechanical properties of metal of welded low alloyed seams by their chemical composition.
AD-653 504 HC$3.00 MF$0.65

SYNTHESIS OF ACETYLENE IN A PLASMA JET,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-653 539 HC$3.00 MF$0.65

INTRODUCTION OF PLASMA TECHNOLOGY IN THE CHEMICAL AND METALLURGICAL INDUSTRY,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-653 554 HC$3.00 MF$0.65

MONEL AND NICKEL CORROSION IN NONAQUEOUS NO2-HF SOLUTIONS,
Brookhaven National Lab., Upton, N. Y.
Akiichi Kigoshi, and Gerald Strickland. Aug 66, 12p
Contract AT (30-2)-GEN-16

Descriptors: (*Corrosion, *Nickel), (*Fission products, Recovery), Containers, Solutions, Graphite, Reactor fuels, Environmental tests, Stresses, Coatings, Heating, Cooling.

For abstract, see NSA 21 13.
BNL-50007 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

NUCLEAR DESALINATION PROGRAM. ANNUAL PROGRESS REPORT ON ACTIVITIES SPONSORED BY THE ATOMIC ENERGY COMMISSION FOR PERIOD ENDING OCTOBER 31, 1966,
Oak Ridge National Lab., Tenn.
C. C. Burwell. Mar 67, 93p
Contract W-7405-eng-26

Descriptors: (*Desalination, *Programming (Computers)), (*Coding, *Nuclear power plants), State-of-the-art reviews, Fast reactors, Breeder reactors

For abstract, see NSA 21 13.
ORNL-4087 HC$3.00 MF$0.65

7B. INORGANIC CHEMISTRY

THE CRYSTAL STRUCTURE OF THE POTASSIUM ALUMINATE K2 (Al2O (OH)6),
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
For primary bibliographic entry see Field 20B.
AD-653 421 Not available from CFSTI.

A CALORIMETRIC AND POTENTIOMETRIC STUDY OF THE SYSTEMS Cl (-)-Hg (2+) AND Br (-)-Hg (2+) AT 250C IN 3M (Na)ClO4 MEDIUM.
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
For primary bibliographic entry see Field 7D.
AD-653 429 Not available from CFSTI.

A MOSSBAUER STUDY OF IRON (II)-1,10-PHENANTHROLINE COMPLEXES,
Victoria Univ Wellington (New Zealand) Dept of Chemistry
For primary bibliographic entry see Field 7E.
AD-653 435 Not available from CFSTI.

THE CRYSTAL STRUCTURE OF Zr2 (OH)2 (SO4)3 (H2O)4,
Royal Inst of Tech Stockholm (Sweden)
For primary bibliographic entry see Field 20B.
AD-653 436 Not available from CFSTI.

ESTUDIOS SOBRE HIDROLISIS DE IONES METALICOS 55.-VANADIO (III) EN MEDIO (K)Cl 3M (Studies Concerning Hydrolysis of Metallic Ions 55. Vanadium (III) in 3 Molar KCl Medium),
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
For primary bibliographic entry see Field 7D.
AD-653 481 Not available from CFSTI.

STUDY ON THE HYDROLYSIS OF METAL IONS. PART 56. SOLVENT EXTRACTION STUDY OF THE HYDROLYSIS OF ZINC (II) IN 3 M NaClO4 AT LOW CONCENTRATION,
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
For primary bibliographic entry see Field 7D.
AD-653 484 Not available from CFSTI.

ESTUDIOS SOBRE EQUILIBRIOS DE POLIANIONES. XIII. POLIMERIZACION DE LOS TELURATOS EN NaCl 1 M y 25 DEGREES (Studies Concerning the Equilibria of Polyanions. XIII. Polymerization of Tellurates in one Molar NaCl Solution at 25 Degrees C),
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
For primary bibliographic entry see Field 7D.
AD-653 485 Not available from CFSTI.

THE ION ACTIVITY FUNCTION - AN APPROACH TO THE STUDY OF ELECTROLYTE BEHAVIOUR IN CONCENTRATED SOLUTIONS,
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
For primary bibliographic entry see Field 7D.
AD-653 502 Not available from CFSTI.

RARE EARTH RESEARCH CONFERENCE (6th), May 3-5, 1967, GATLINBURG, TENNESSEE.
Oak Ridge National Lab Tenn
For primary bibliographic entry see Field 13H.
AD-653 605 HC$3.00 MF$0.65

DETECTION OF MERCURIC CYANIDE AND ALKALI HALIDES IN PRESENCE OF ALKALI CYANIDE,
Aerospace Research Labs Wright-Patterson AFB Ohio
F. Feigl. 10 May 66. 6p Rept no. ARL-67-0097
Availability: Published in Journal Mikrochimica Acta, Wein p345-6 1967.

Descriptors: (*Cyanides, *Microanalysis), (*Mercury compounds, Microanalysis), (*Alkali metal compounds, Microanalysis), Oxidation, Chemical indicators, Chemical precipitation, Sensitivity, Halides.
Identifiers: Mercuric cyanide.

Methods are given for the detection of mercuric cyanide and of alkali halides, both in the presence of alkali cyanide, which may be carried out in the technique of spot test analysis.
AD-653 667 Not available from CFSTI.

PROPERTIES OF MERCURY CHALCOGENIDES,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20L.
AD-653 688 Not available from CFSTI.

NEW RHODIUM CHELATES OF HEXAFLUORO ACETYLACETONE,
Aerospace Research Labs Wright-Patterson AFB Ohio
S. C. Chattoraj, and R. E. Sievers. Apr 67. 8p Rept no. ARL-67-0066
Availability: Published in Inorganic Chemistry v6 n2 p408-11 1967.

Descriptors: (*Chelate compounds, *Rhodium compounds), (*Halogenated hydrocarbons, Chelate compounds), Acetones, Chemical reactions, Complex compounds, Synthesis (Chemistry), Nuclear magnetic resonance, Spectra (Infrared), Spectra (Visible + ultraviolet), Molecular structure, Heterocyclic compounds, Fluorine compounds, Chlorine compounds.
Identifiers: Rhodium hexafluoro acetylacetonates, Hexafluoro acetyl acetones.

The reaction between hexafluoroacetylacetone (H (hfa)) and rhodium (III) chloride trihydrate in basic aqueous medium yields the expected compound, Rh (hfa)3; however, when the same reactants were mixed in an absolute ethanol medium, a new compound, RhCl (hfa)2.3H2O, was isolated. This compound, on vacuum sublimation, yielded a sublimate from which two other new compounds, I (brownish-yellow crystals) and II (red crystals), were also isolated. The syntheses and the N.m.r., infrared, and ultraviolet spectra of these new rhodium chelates as well as of Rh (hfa)3 are discussed. Chemical analyses and infrared spectra indicate that both I and II are anhydrous and have the empirical formula, RhCl (hfa)2. Molecular weight measurements in carbon tetrachloride indicate that II is dimeric. On the basis of F-19 and H-1 N.m.r. measurements on II, it was concluded that the rhodium ions are bridged through the two chloro groups. (Author)
AD-653 704 Not available from CFSTI.

THE OXIDATIVE CLEAVAGE OF ORGANOSILANES. III. OZONE AND THE SILICON-ALKYL, -ARYL, -HYDROGEN, AND -OXYGEN BONDS,
Aerospace Research Labs Wright-Patterson AFB Ohio
Leonard Spialter, and J. Dudley Austin. May 67. 8p Rept no. ARL-67-0079
Availability: Published in Inorganic Chemistry v5 p1975-8 1966.

Descriptors: (*Silanes, Decomposition), Ozone, Chemical bonds, Oxidation, Siloxanes, Alkanes, Aromatic compounds, Alcohols.

The cleavage by ozone of Si-Y bonds, where Y is hydrogen, hydroxyl, alkoxyl, alkyl, aryl, or silicon, was examined. It is found that ozone, at room temperature, causes rupture in all cases with the formation of hydroxysilanes or siloxanes, depending upon the nature of Y and other substituents on silicon. (Author)
AD-653 706 Not available from CFSTI.

THE CHLOROFLUORINATION OF ACETONITRILE. PREPARATION OF N-CHLORO-N-FLUORO-1,1-DIFLUOROETHYLAMINE,
Rohm and Haas Co Huntsville Ala Redstone Research Labs
For primary bibliographic entry see Field 7C.
AD-653 765 Not available from CFSTI.

SEPARATION OF VANADIUM, ZIRCONIUM, TITANIUM, MOLYBDENUM, TUNGSTEN, AND COLUMBIUM BY ELUTION DEVELOPMENT ION EXCHANGE CHROMATOGRAPHY.
Army Materials Research Agency Watertown Mass
For primary bibliographic entry see Field 11F.
AD-653 767 HC$3.00 MF$0.65

ION EXCHANGE ANALYSIS OF COLUMBIUM ALLOYS.
Army Materials Research Agency Watertown Mass
For primary bibliographic entry see Field 11F.
AD-653 768 HC$3.00 MF$0.65

INFRARED SPECTRA AND STRUCTURE OF SILICON COBALT TETRACARBONYLS,
Pennsylvania Univ Philadelphia John Harrison Lab of Chemistry
For primary bibliographic entry see Field 7D.
AD-653 829 Not available from CFSTI.

EXCITONS AND OPTICAL PROPERTIES OF THE ALKALI HALIDES,
Rochester Univ N Y Inst of Optics
For primary bibliographic entry see Field 20F.
AD-653 830 Not available from CFSTI.

THE PREPARATION AND STRUCTURE OF ZIRCONIA SPHERES,
Mcmaster Univ Hamilton (Ontario) Dept of Metallurgy and Metallurgical Engineering
For primary bibliographic entry see Field 11G.
AD-653 833 Not available from CFSTI.

GEOMETRY OF THE TRANSITION-METAL DIHALIDES: THE FLUORIDES OF MANGANESE, COBALT, NICKEL, COPPER, AND ZINC,
Little (Arthur D) Inc Cambridge Mass
For primary bibliographic entry see Field 7D.
AD-653 888 Not available from CFSTI.

SPOT TESTS FOR THE DETECTION OF ELEMENTAL ARSENIC, ANTIMONY, AND TIN.
Revised ed.,
Aerospace Research Labs Wright-Patterson AFB Ohio
F. Feigl, and F. L. Chan. 5 Jul 66. 5p Rept no. ARL-67-0086
Revision of manuscript received 27 Jun 66.
Availability: Published in Chemist-Analyst v56 p13 Jan 1967.

Descriptors: (*Antimony, Chemical analysis), (*Arsenic, Chemical analysis), (*Tin, Chemical analysis), Ammonium compounds, Halides, Pyrolysis, Deposits, Colors.

Rapid spot tests for the detection and identification of elemental arsenic, antimony and tin were developed. These tests are based upon the pyroly-

tic reactions with the ammonium halides and the characteristics produced by these elements. Four procedures are described. (Author)
AD-653 901 Not available from CFSTI.

SPOT TESTS FOR THE DETECTION OF BOUND ARSENIC AND ANTIMONY,
Aerospace Research Labs Wright-Patterson AFB Ohio
F. Feigl, and F. L. Chan. 1 Aug 66, 5p Rept no. ARL-67-0087
Availability: Published in Chemist-Analyst v56 p14 Jan 1967.

Descriptors: (*Antimony compounds, Chemical analysis), (*Arsenic compounds, Chemical analysis), Ammonium compounds, Bromides, Pyrolysis, Sulfides, Deposits, Colors, Metalorganic compounds.

Spot tests are described for the detection and confirmation of compounds of arsenic and antimony. These tests are applicable to both inorganic and organic compounds. Three procedures are described. (Author)
AD-653 902 Not available from CFSTI.

DETERMINATION OF ELECTRONIC SYMMETRY BY ELECTRIC DEFLECTION: LiO AND LaO,
Little (Arthur D) Inc Cambridge Mass
For primary bibliographic entry see Field 7D.
AD-654 016 Not available from CFSTI.

ELECTRIC-DEFLECTION STUDIES OF THE GEOMETRY OF SOME MOLECULES CONTAINING CESIUM,
Little (Arthur D) Inc Cambridge Mass
For primary bibliographic entry see Field 7D.
AD-654 017 Not available from CFSTI.

GASEOUS ALKALI-NITROGEN-OXYGEN AND ALKALI-PHOSPHORUS-OXYGEN COMPOUNDS,
Little (Arthur D) Inc Cambridge Mass
For primary bibliographic entry see Field 7D.
AD-654 018 Not available from CFSTI.

INFRARED SPECTRA OF LITHIUM MONOMERS,
Little (Arthur D) Inc Cambridge Mass
For primary bibliographic entry see Field 7D.
AD-654 020 Not available from CFSTI.

THE DETERMINATION OF THE GEOMETRY OF HIGH-TEMPERATURE SPECIES BY ELECTRIC DEFLECTION AND MASS SPECTROMETRIC DETECTION,
Little (Arthur D) Inc Cambridge Mass
For primary bibliographic entry see Field 7D.
AD-654 058 Not available from CFSTI.

SOLID-STATE STUDIES OF OXYGEN-DEFICIENT TANTALUM PENTOXIDE,
Cornell Univ Ithaca N Y Baker Lab of Chemistry
For primary bibliographic entry see Field 20L.
AD-654 147 Not available from CFSTI.

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

FURTHER TESTS OF DILUTE SOLUTION EQUATIONS AND THERMODYNAMIC RELATIONSHIPS.,
Los Alamos Scientific Lab., N. Mex.
Harold S. Swofford, Jr., and Guy R. B. Elliott. 1 Oct 65, 24p
Contract W-7405-eng-36

Descriptors: (*Cadmium, *Vapor pressure), (*Lead alloys, *Liquid metals), Solutions, Equations, Thermodynamics, Melting.

For abstract, see NSA 21 13.
LA-3657 HC$3.00 MF$0.65

APPLICABILITY OF THE LOW-TEMPERATURE IGNITION METHOD FOR DETERMINING CARBON IN VARIOUS ALKALI METALS.
Ledoux and Co., Inc., Teaneck, N. J.
E. W. Hobart, S. Kallmann, and R. Stevenson. 21 Oct 66, 14p NASA-CR-84377
Contract NASW-1192

Descriptors: *Alkali metal, *Carbon, *Ignition, Acid, Alkali, Alloy, Black, Carbonate, Cesium, Chromatography, Dioxide, Gas, Lithium, Low temperature, Measurement, Metal, Potassium, Rubidium.

For abstract, see STAR 05 15.
N67-28004 HC$3.00 MF$0.65

KINETIC STUDY OF ELECTRICALLY ACTIVATED REACTING SYSTEMS AT RELATIVELY LOW TEMPERATURE LEVELS ANNUAL STATUS REPORT, SEP. 1965 - SEP. 1966.
Villanova Univ., Pa. Research and Development Div.
H. T. Koonce, and G. C. Yeh. Sep 66, 17p
NASA-CR-84661
Contract NGR-39-023-002

Descriptors: *Gas reactor, *Kinetics, *Low temperature environment, Current, Electric, Electrode, Emission, Environment, Field, Gas, Low temperature, Reaction, Reactor.

For abstract, see STAR 05 15.
N67-28015 HC$3.00 MF$0.65

A SURVEY OF SOME METAL OXIDATION PROBLEMS QUARTERLY PROGRESS REPORT NO. 13, 1 JAN. - 31 MAR. 1966.
Brussels Univ. (Belgium).
1966, 12p EURAEC-1619, EUR-2832
Contract EURATOM-079-64-10-TEEB

Descriptors: *Aluminum, *Copper, *Iodate, *Oxidation, Control, Crystalline, Force, Growth, Incubation, Layer, Nucleation, Nucleus, Pressure, Reactor, Temperature.

For abstract, see STAR 05 15.
N67-28214 HC$3.00 MF$0.65

OSCILLATOR STRENGTHS FOR RESONANCE LINES OF SOME SILICON AND SULFUR IONS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
S. O. Kastner. Apr 67, 8p NASA-TM-X-55802, X-614-67-238

Descriptors: *Oscillator, *Resonance, *Silicon, *Sulfur, Atom, Coupling, Energy, Excitation, Function, Interaction, Spin-spin, State, Transition, Wave.

For abstract, see STAR 05 15.
N67-28799 HC$3.00 MF$0.65

DETECTION AND SEMIQUANTITATIVE DETERMINATION OF PHOSPHOROUS IN PHOSPHOROUS PENTOXIDE CATALYTICALLY BLOWN ASPHALT CEMENT--LOWER COST CANAL LINING PROGRAM,
Bureau of Reclamation, Denver, Colo. Chemical Engineering Branch.
For primary bibliographic entry see Field 13C.
PB-174 844 HC$3.00 MF$0.65

7C. ORGANIC CHEMISTRY

FLUOROCARBON NITRIDE ELASTOMERS.
Thiokol Chemical Corp Denville N J Reaction Motors Div
For primary bibliographic entry see Field 11J.
AD-653 432 HC$3.00 MF$0.65

STEREOCHEMICAL EQUILIBRIUM IN CHAIN MOLECULES,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 7D.
AD-653 477 Not available from CFSTI.

ESTUDIOS SOBRE EQUILIBRIOS DE POLIANIONES. XIV. VANADATOS EN LA REGION DE INESTABILIDAD, 40C Y Na (Cl) 0.5 M (Studies Concerning the Equilibria of Polyanions. XIV. Vanadates in the Instability Range, 40C and Na (Cl) 0.5 M),
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
For primary bibliographic entry see Field 7D.
AD-653 486 Not available from CFSTI.

HALOMETHYL-METAL COMPOUNDS VIII. THE REACTION OF PHENYL (TRIHALOMETHYL)MERCURY COMPOUNDS WITH HYDROGEN CHLORIDE,
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Dietmar Seyferth, Jeffrey Yick-Pui Mui, Lee J. Todd, and Kiek V. Darragh. 26 Jul 66, 10p
AFOSR-67-1295
Grant AF-AFOSR-502-66
See also AD-646 394.
Availability: Published in Journal of Organometallic Chemistry v8 p29-36 1967.

Descriptors: (*Metalorganic compounds, *Mercury compounds), (*Halogenated hydrocarbons, Metalorganic compounds), Synthesis (Chemistry), Hydrochloric acid, Chlorine compounds, Bromine compounds, Chloroform, Chemical reactions, Decomposition.
Identifiers: Carbenes, Mercurials, Phenyl (bromodichloromethyl)mercurials, Phenyl (tribromomethyl)mercurials, Phenyl (trichloromethyl)mercurials.

Dihalocarbenes (CCl2,CClBr,CBr2) obtained from the corresponding C6H5HgCXYBr compounds were found to insert into the H-Cl bond, giving haloforms, HCCl3, HCCl2Br and HCBr2Cl, respectively. In chlorobenzene solution at 80C C6H5-Hg cleavage is a competing reaction which in the case of C6H5HgCBr3 accounts for 80% of the HCl consumed. The resulting CBr3HgCl introduces further complications, since CX2 insertion into the Hg-Cl bond occurs, giving HgCX2Br compounds which are sources of carbenes other than those derived from the starting mercurial. At room temperature only the C6H5-Hg cleavage reaction is observed, and this allowed preparation of pure ClHgCCl3, ClHgCCl2Br, ClHgCClBr2 and ClHgCBr3. The action of methanolic HCl on C6H5HgCCl3 produces phenylmercuric chloride and chloroform; a possible explanation for this marked solvent effect is presented. (Author)
AD-653 491 Not available from CFSTI.

SYNTHESIS OF NEW ANILS OF HETEROCYCLIC AND AROMATIC SERIES,
Foreign Technology Div Wright-Patterson AFB Ohio
Yu. A. Zhdanov, I. D. Sadekov, A. D. Garnovsk-

ii, and V. I. Minkin. 28 Feb 67, 11p Rept no. FTD-HT-67-190
TT-67-62109
Sintez Novykh Anilov Geterotsiklicheskogo i Aromaticheskogo Ryadov, unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Khimiya i Khimicheskaya Tekhnologiya (USSR) v8 n6 p954-8 1965.

Descriptors: (*Organic nitrogen compounds, Synthesis (Chemistry)), (*Aromatic compounds, Synthesis (Chemistry)), (*Heterocyclic compounds, Synthesis (Chemistry)), Amines, Aldehydes, Physical properties, Chemical properties, Complex compounds.
Identifiers: Anils.

Thirty-five anils and O-hydroxyanils of aromatic and heterocyclic aldehydes that have not been described in literature were synthesized. The characteristics and a description of them are given in a table.
AD-653 538 HC$3.00 MF$0.65

TEST OF THE REVERSIBILITY OF THE PLATINUM-CATALYZED HYDROSILYATION OF OLEFINS,
Aerospace Research Labs Wright-Patterson AFB Ohio
Leonard Spialter, and Daniel H. O'Brien. 8 Aug 66, 6p Rept no. ARL-67-0040
Availability: Published in Journal of Organic Chemistry v32 p222-3 1967.

Descriptors: (*Silanes, Addition reactions), (*Alkenes, Addition reactions), Catalysis, Catalysts, Platinum compounds, Reaction kinetics, Chemical equilibrium, Molecular rotation.
Identifiers: Methylbudyl silanes.

The addition of silicon hydrides across unsaturated carbon-carbon bonds under the remarkably efficient catalysis by chloroplatinic acid and other platinum compounds has been extensively studied by various workers. A test was made of whether or not there is a kinetically significant equilibrium involving the terminal additon compound and its precursors, the olefin, and the hydrosilane at temperatures up to 100C in the presence of homogeneous and heterogeneous platinum catalysts. For this purpose, an optically active alkyl substituent, (S)-2-methylbutyl, on silicon was selected since it contains only one asymmetric center, the beta carbon, and this bears the requisite hydrogen atom. The results indicate that, under a variety of dynamic conditions, an asymmetric hydrogen-bearing carbon atom in the beta position to silicon does not racemize under hydrosilylation conditions. Hence, this latter reaction does not, at least for the primary alkylsilane case (i.e., terminal silicon), involve a kinetically significant equilibrium between hydrosilylation products and their precursors.
AD-653 655 Not available from CFSTI.

REACTIONS OF C3H6 (+) WITH C3 AND C4 PARAFFINS,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7D.
AD-653 705 Not available from CFSTI.

THE OXIDATIVE CLEAVAGE OF ORGANOSILANES. III. OZONE AND THE SILICON-ALKYL, -ARYL, -HYDROGEN, AND -OXYGEN BONDS,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7B.
AD-653 706 Not available from CFSTI.

LOW-TEMPERATURE FLUORINATION OF ALIPHATIC ISOCYANATES AND CARBAMYL HALIDES,
Rohm and Haas Co Huntsville Ala Redstone Research Labs
Richard F. Merritt. 9 Nov 66, 3p
Contract DA-01-021-ORD-11878
Availability: Published in Journal of Organic Chemistry v32 p1633-5 May 1967.

Descriptors: (*Organic nitrogen compounds, *Fluorination), Nitriles, Aliphatic compounds, Chlorides, Fluorides, Ureides, Synthesis (Chemistry), Substitution reactions.
Identifiers: Isocyanates, Butyl fluorocarbamyl fluorides, Ethyl fluorocarbamyl fluorides, Propyl fluorocarbamyl chlorides, Carbamyl chlorides, Carbamyl fluorides.

The fluorination of the CN double bonds of alkyl isocyanates does not involve direct addition but rather side-chain fluorination followed by substitution on nitrogen of the carbamyl fluoride by-product. Direct, low-temperature fluorination of carbamyl fluorides or chlorides provides a convenient synthetic procedure for N-fluorocarbamyl halides. Suth halides are useful precursors to other N-fluoroureas and carbamates. (Author)
AD-653 764 Not available from CFSTI.

THE CHLOROFLUORINATION OF ACETONITRILE. PREPARATION OF N-CHLORO-N-FLUORO-1,1-DIFLUOROETHYLAMINE,
Rohm and Haas Co Huntsville Ala Redstone Research Labs
Max Lustig. 17 Dec 66, 3p
Contract DA-01-021-AMC-11536 (Z)
Availability: Published in Inorganic Chemistry v6 n5 p1064-5 May 1967.

Descriptors: (*Acetonitriles, *Halogenation), (*Halogenated hydrocarbons, Synthesis (Chemistry)), Fluorination, Chlorination, Amines, Molecular structure, Chlorine compounds, Fluorides, Nuclear magnetic resonance, Spectra (Infrared).
Identifiers: Chlorine pentafluoride, Chlorofluoro difluoroethyl amines.

Chlorine (V) fluoride was used to chlorofluorinate the C-N triple bond in acetonitrile to prepare CH3CF2-NFCl. The reaction proceeds smoothly below room temperature. Both the physical and the chemical characterizations of the new compound are in accord with the proposed structure. (Author)
AD-653 765 Not available from CFSTI.

THE ELECTROMAGNETIC ACTIVITY OF PORPHIN DERIVATIVES.
Final rept., 1 Jun 63-30 Jun 67,
Pennsylvania Univ Philadelphia John Harrison Lab of Chemistry
Alan D. Adler. 30 Jun 67, 8p
AROD-4278:10-C
Contract DA-31-124-ARO (D)-101

Descriptors: (*Porphyrins, Electrochemistry), Molecular structure, Electromagnetic properties, Synthesis (Chemistry), Chemical properties, Films, Crystals.

The basic objective of the research was to explore the possibilities of using porphin derivatives as model compounds in a study of structure-property and structure-reactivity relationships. The large number of porphyrin structures available, their wide range of chemical reactivity, their correspondingly wide range of interesting physical properties, and their fundamental biological importance recommended porphyrins as suitable materials for such a research program. Of particular interest were the electromagnetic properties of oriented films and crystals of these materials and their relationships to corresponding electrochemical parameters in solutions of these materials that are of biological interest. (Author)
AD-653 842 HC$3.00 MF$0.65

(+) (S)-2-METHYLBUTYLSILANE. OPTICAL ASYMMETRY DUE TO SILICON VS. CARBON,
Aerospace Research Labs Wright-Patterson AFB Ohio
Leonard Spialter, and Daniel H. O'Brien. 13 Apr 66, 6p Rept no. ARL-66-0199
Availability: Published in Journal of Organic Chemistry v31 p3048-9 Sep 1966.

Descriptors: (*Silanes, *Molecular rotation), Stereochemistry, Spectra (Visible + ultraviolet), Chlorine compounds, Synthesis (Chemistry).
Identifiers: Methylbutyl silanes, Methylbutyl trichlorosilanes.

(+)- (S)-2-Methylbutyl silane and (+)- (S)-2-Methylbutyl trichlorosilane were synthesized and found to have no u.v. absorption bands between 7000A and 2200A. Their optical rotatory dispersion curves from 6600A to 2300A were negative plain and positive plain, respectively. It appears that the asymmetric contribution of the -CH2SiH3 group is very similar in magnitude and sign to that of the propyl group in optical activity. These are evidently the first reported compounds possessing an asymmetric algyl group attached directly to silicon.
AD-653 897 Not available from CFSTI.

2-CYCLOHEXYLETHYL TRICYCLOHEXYLSILANE. FORMATION OF CYCLOHEXYLETHYL LITHIUM FROM THE CLEAVAGE OF ETHYL ETHER BY CYCLOHEXYL LITHIUM,
Aerospace Research Labs Wright-Patterson AFB Ohio
Leonard Spielter, and Charles W. Harris. 13 Jun 66, 6p Rept no. ARL-67-0028
Availability: Published in Journal of Organic Chemistry v31 p4263-4 1966.

Descriptors: (*Silanes, Synthesis (Chemistry)), (*Metalorganic compounds, *Lithium compounds), Polycyclic compounds, Condensation reactions, Chemical bonds, Decomposition, Amides.
Identifiers: Cyclohexylethyl lithium, Cyclohexylethyl tricyclohexylsilanes.

In the course of studying the condensation reaction between cyclohexyllithium and tricyclohexylfluorosilane to give tetracyclohexylsilane, (cyclo-C6H11)4Si, a product was obtained, under certain conditions, which contained only carbon, hydrogen, and silicon, but whose analysis and molecular weight were just outside acceptable limits for the desired compound. It was inferred that the new compound might be 2-cyclohexylethyltricyclohexylsilane, (cyclo - C6H11 - CH2-CH2)Si (cyclo-C6H11)3. Independent synthesis of this substance from 2-cyclohexylethyllithium and tricyclohexylfluorosilane confirmed the hypothesis. These results suggested that cyclohexyllithium, under proper conditions, cleaved ethyl ether with the effective insertion of ethyl between the alkyl group and lithium, yielding 2-cyclohexylethyllithium. A solution of cyclohexyllithium in ethyl ether, after treatment with pulverized solid carbon dioxide, 3-cyclohexylpropionic acid, characterized as the amide, and identical with an authentic sample.
AD-653 900 Not available from CFSTI.

SPOT TESTS FOR THE DETECTION OF BOUND ARSENIC AND ANTIMONY,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7B.
AD-653 902 Not available from CFSTI.

SYNTHESIS OF POLYMERS CONTAINING FERROCENENITROGEN WITH A SYSTEM OF CONJUGATED BONDS,
Foreign Technology Div Wright-Patterson AFB Ohio

T. R. Vishnyakova, I. A. Golubeva, and Ya. M. Paushkin. 21 Feb 67, 13p Rept no. FTD-HT-66-416
TT-67-62136
Sintez Ferrotsenazotsoderzhashc
hikh Polimerov s Sistemoi Sopryazhennykh Svyazei. Unedited rough draft trans. of Vysokomolekulyarnye Soedineniya (USSR) v8 n1 p181-5 1966.

Descriptors: (*Polymers, *Metalorganic compounds), (*Ferrocenes, Polymers), (*Nitriles, Polymers), (*Semiconductors, Polymers), Organic nitrogen compounds, Polymerization, Condensation reactions, Ammonium compounds, Amides, Carboxylic acids, Catalysts, Physical properties, Electrical properties, Molecular structure, Spectra (Infrared), Nuclear magnetic resonance, USSR.
Identifiers: Metalorganic polymers, Organic semiconductors, Poly ferrocenylnitriles.

New ferrocene- and nitrogen-containing polymers-polyferrocenylnitriles- were prepared by polycondensation of amides or ammonium salts of ferrocenecarboxylic acids. The reaction was conducted in an autoclave in the absence of atmospheric oxygen and in the presence of ZnCl2 catalyst. Polyferrocenylnitrile was prepared at 170-200C from ferrocenecarboxamide, ammonium ferrocenecarboxylate, as well as from ferrocene proper. Polyferrocenyldinitrile was also prepared at 200C from 1,1'-ferrocenedicarboxamide and from diammonium 1,1'-ferrocenedicarboxylate. All the polymers were black to brown powders. Structures were confirmed by IR spectroscopy. The temperature dependence of conductivity of the polymers was exponential in character. (Author)
AD-653 957 HC$3.00 MF$0.65

ORGANOSILICON DERIVATIVES OF FERROCENE,
Foreign Technology Div Wright-Patterson AFB Ohio
Kuan-li Wu. 14Mar 67, 19p Rept no. FTD-HT-66-488
TT-67-62147
Edited trans. of Hua Hsueh T'ung Pao (Chinese People's Republic) n5 p293-301 1963. AD-618 007-Superseded, TT-65-62630.

Descriptors: (*Ferrocenes, Synthesis (Chemistry)), (*Siloxanes, Synthesis (Chemistry)), Silanes, Metalation, Metalorganic compounds, Hydrolysis, China.
Identifiers: Silyl ferrocenes.

Methods of synthesizing organosilicon derivatives of ferrocene are described in detail.
AD-653 963 HC$3.00 MF$0.65

THE CHEMISTRY OF CARBANIONS. X. THE SELECTIVE ALKYLATION OF UNSYMMETRICAL KETONES,
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Herbert O. House, and Barry M. Trost. 19 Mar 65, 13p
AFOSR-67-1423
Grant AF-AFOSR-573-64
Availability: Published in Journal of Organic Chemistry v30 p2502-12 Aug 1965.

Descriptors: (*Ketones, Alkylation), Acetates, Solutions, Molecular isomerism, Ions, Cyclopentanes, Polycyclic compounds, Cyclohexanes, Stereochemistry.
Identifiers: Decalones, Heptanones, Methyl cyclohexanones, Methyl cyclopentanones.

Solutions of enolate anions which retain their structural and stereochemical integrity can be prepared by reaction of the corresponding enol acetates with 2 equiv. of methyllithium in 1,2-dimethoxyethane. By use of this procedure it is possible to effect the selective alkylation of unsymmetrical ketones at either the more or less highly substituted alpha-position, utilizing the appropriate enol acetate derivative of the ketone. Selective alkylations of 2-heptanone, 2-methylcyclopentanone, 2-methylcyclohexanone, and 1-decalone are described. The proportion of cis-fused 9-methyl-1-decalone obtained from alkylation of 1-decalone can be significantly enhanced by use of the very reactive alkylating agent, trimethyloxonium 2,4,6-trinitrobenzenesulfonate . (Author)
AD-654 121 Not available from CFSTI.

DEVELOPMENT OF A RADIOACTIVE PEBBLE BED CHEMICAL REACTOR SYSTEM.
Final rept. on phase 1,
Western New York Nuclear Research Center, Inc., Buffalo.
C. H. Collins, H. T. Cullinan, and C. C. Thomas, Jr. 15 Sep 66, 84p
Contract AT (30-1)-3718

Descriptors: (*Aromatic compounds, *Chlorination), Costs, Nuclear reactors, Toluenes, Nuclear radiation, Benzenes, Patents, Photochemistry.

For abstract, see NSA 21 13.
NYO-3718-1 HC$3.00 MF$0.65

STUDIES ON KINETICS AND THE MECHANISM OF THE OXIDATION OF HYDROCARBONS IN THE GAS PHASE. PART IV. A GAS CHROMATOGRAPHIC METHOD FOR THE ANALYSIS OF THE INTERMEDIATE OXIDATION PRODUCTS OF N-HEPTANE.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 15.
N67-27797 HC$3.00 MF$0.65

THE RADIOLYTIC AND PYROLYTIC DECOMPOSITION OF ORGANIC COOLANTS. III - THE RADIOLYSIS AND PYROLYSIS OF M-TERPHENYL AND M- TERPHENYL-D14.
European Atomic Energy Community, Ispra (Italy).
For primary bibliographic entry see Field 7E.
For abstract, see STAR 05 15.
N67-27875 HC$3.00 MF$0.65

THE THERMODYNAMIC PROPERTIES OF DEUTERIUM.
National Bureau of Standards, Boulder, Colo. Cryogenics Div.
R. Prydz. 18 Apr 67, 93p NASA-CR-84873, NBS-9276
NASA ORDER R-06-006-046

Descriptors: *Deuterium, *Thermodynamic property, Coefficient, Data, Density, Energy, Enthalpy, Entropy, Equation, Gas, Heat, Internal, Liquid, Pressure, Property, State, Table, Temperature, Thermodynamic, Vapor, Vaporization, Virial, Volume.

For abstract, see STAR 05 15.
N67-28936 HC$3.00 MF$0.65

X-RAY DIFFRACTION DATA ON LIQUID 2,2-DIMETHYLPROPANE (NEOPENTANE) AT 25 DEGREES C,
Oak Ridge National Lab., Tenn.
A. H. Narten, and H. A. Levy. Apr 67, 29p
Contract W-7405-eng-26

Descriptors: (*X-ray diffraction analysis, *Propanes), Liquids, Cryogenics, Distribution functions, Computer programs, Low-temperature research.

For abstract, see NSA 21 13.
ORNL-4103 HC$3.00 MF$0.65

7D. PHYSICAL CHEMISTRY

KINETIC METHODS AND THE FREE EXPANSION PROBLEM,
Geophysics Corp. of America, Bedford, Mass.
For primary bibliographic entry see Field 20D.
AD-291 772 HC$3.00

ELECTROCHEMISTRY OF FUEL CELL ELECTRODES. SURFACE OXIDATION OF GOLD ELECTRODES.
Tyco Labs., Inc., Waltham, Mass.
For primary bibliographic entry see Field 10B.
AD-423 991 HC$3.00

MEASUREMENT OF ABSORPTION-LINE PROFILES WITH A FABRY-PEROT INTERFEROMETER,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20F.
AD-653 410 Not available from CFSTI.

SPARK-SOURCE MASS SPECTROSCOPY,
Massachusetts Inst of Tech Lexington Lincoln Lab
Edward B. Owens. 16 Aug 66, 9p Rept no. JA-2887
ESD-TR-67-255
Contract AF 19 (628)-5167
Prepared for presentation at the National Meeting of SAS (5th), 13-17 June 1966 at Chicago.
Availability: Published in Applied Spectroscopy v21 n1 p1-8 Jan/Feb 1967.

Descriptors: (*Mass spectroscopy, Reviews), Spectrometers, Photographic emulsions, Sparks, Gas ionization, Calibration, Ion sources.

The paper is a review presenting a description of the instrument and method, a brief summary of the early work, and a more detailed look at the development since 1960. Studies on the properties of photographic emulsions as ion detectors and the optimum conditions for their use are reported. Various methods are reported for quantitative data treatment, which include plate calibration, photometry, and corrections. Investigations of the spark source are reviewed, covering the causes and effects of the varying energy spectra and some corrections for the relative volatility and diffusion rates. The contribution of the sample itself to the analytical error is discussed, and the results obtained with rigorous standardization are presented. (Author)
AD-653 414 Not available from CFSTI.

INTENSITY OF ATOMIC FLUORESCENCE AS A FUNCTION OF ATOMIC CONCENTRATION IN ATOMIC FLUORESCENCE FLAME SPECTROMETRY,
Florida Univ Gainesville Dept of Chemistry
J. D. Winefordner, M. L. Parsons, J. M. Mansfield, and W. J. McCarthy. 8 Apr 66, 18p
AFOSR-67-1299
Grant AF-AFOSR-1033-66
Availability: Published in Spectrochimica Acta v23B p37-51 1967.

Descriptors: (*Atomic spectroscopy, *Fluorescence), Chemical elements, Concentration (Chemistry), Line spectrum, Continuous spectrum, Intensity, Flames.
Identifiers: Flame spectroscopy.

Expressions for the intensity of atomic fluorescence of atoms in atomic fluorescence flame spectrometry are derived by a simple approach. In this approach the atomic fluorescence of atoms at low and high concentrations excited by narrow line and continuous sources is considered, and the approach is general for resonance, stepwise-line, and

direct-line fluorescence. The derived expressions are discussed with regard to comparison of sources of excitation, improvement of detection limits, and shapes of analytical growth curves when using atomic fluorescence flame spectrometry as an analytical method. (Author)
AD-653 419 Not available from CFSTI.

DERIVATION OF GENERAL EXPRESSIONS FOR QUANTUM AND POWER EFFICIENCIES FOR ATOMIC FLUORESCENCE OF ATOMS IN HOT GAS WITH EMPHASIS ON ATOMIC FLUORESCENCE FLAME SPECTROMETRY,
Florida Univ Gainesville Dept of Chemistry
W. J. McCarthy, M. L. Parsons, and J. D. Winefordner. 8 Apr 66, 15p
AFOSR-67-1300
Grant AF-AFOSR-1033-66
Availability: Published in Spectrochimica Acta v23B p25-36 1967.

Descriptors: (*Atomic spectroscopy, *Fluorescence), Chemical elements, Line spectrum, Continuous spectrum, Emissivity, Resonance, Electron transitions, Gases, Mercury, Thallium, Sodium.
Identifiers: Flame spectroscopy, Quantum efficiency.

The general equations for the quantum efficiency of resonance, direct-line, and stepwise fluorescence of atoms in a hot gas (a flame in atomic fluorescence flame spectrometry) are derived. A kinetic approach is used to obtain the exact expressions for the quantum efficiencies. Expressions are derived for a combination of resonance, direct-line and step-wise line atomic fluorescence which results when unfiltered line sources or continuous sources of excitation are used. The general equations for power efficiency are presented. Examples of using the derived expressions for calculation of quantum efficiencies for spectral lines of atoms exhibiting each type of atomic fluorescence are given and discussed. The experimental measurement of quantum efficiencies of spectral lines of atoms in flames is also discussed. (Author)
AD-653 426 Not available from CFSTI.

COMPARISON OF LINE AND CONTINUOUS SOURCES IN ATOMIC ABSORPTION SPECTROPHOTOMETRY,
Florida Univ Gainesville Dept of Chemistry
L. de Galan, W. W. McGee, and J. D. Winefordner. 2 Jun 66, 12p
AFOSR-67-1301
Grant AF-AFOSR-1033-66
Availability: Published in Analytica Chimica Acta v37 p436-44 1967.

Descriptors: (*Atomic spectroscopy, Sources), Line spectrum, Continuous spectrum, Absorption spectrum, Signals, Bandwidth, Monochromators, Chemical elements, Discharge tubes.

Expressions are given for the absorption signal (absorbance or fraction absorbed) in atomic absorption spectrophotometry with a line source and a continuous source, respectively. A theoretical and experimental comparison is made between the shape of the working curves, the magnitude of the signals, and the limits of detection in both cases. The significance of the spectral bandwidth of the monochromator and the absorption line profile is discussed. With a good medium-dispersion monochromator, a continuous source offers several distinct advantages and yields detection limits which are approximately the same as those obtained with a hollow-cathode discharge tube. (Author)
AD-653 427 Not available from CFSTI.

USE OF A CONTINUOUS SOURCE OF EXCITATION, AN ARGON-HYDROGEN-AIR FLAME, AND AN EXTENDED FLAME CELL FOR ATOMIC ABSORPTION FLAME SPECTROPHOTOMETRY,
Florida Univ Gainesville Dept of Chemistry
W. W. McGee, and J. D. Winefordner. 2 Jun 66, 9p
AFOSR-67-1305
Grant AF-AFOSR-1033-66
Availability: Published in Analytica Chimica Acta v37 p429-35 1967.

Descriptors: (*Atomic spectroscopy, Sources), Chemical elements, Excitation, Flames, Absorption spectrum, Continuous spectrum, Argon, Hydrogen, Air.
Identifiers: Flame spectroscopy.

A continuous source of excitation in conjunction with an argon-hydrogen-entrained air flame, an extended flame cell, a medium-dispersion monochromator and a typical detection system is shown to give good sensitivities for the atomic absorption flame spectrophotometric measurement of 21 elements. Useful working curves over a 100-fold concentration range are obtained for each of the 21 elements using the simple experimental system. The advantages gained with this system are discussed. (Author)
AD-653 428 Not available from CFSTI.

A CALORIMETRIC AND POTENTIOMETRIC STUDY OF THE SYSTEMS Cl (-)-Hg (2+) AND Br (-)-Hg (2+) AT 250C IN 3M (Na)ClO4 MEDIUM,
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
Robert Arnek. 1 Oct 65, 23p
AFOSR-67-1312
Grants AF-EOAR-65-22, AF-EOAR-63-8
Availability: Published in Arkiv fuer Kemi v24 n40 p531-50 1965.

Descriptors: (*Complex compounds, Volumetric analysis), (*Mercury compounds, Volumetric analysis), (*Calorimetry, Complex compounds), Chlorides, Bromides, Enthalpy, Electrolytes, Sodium compounds, Perchlorates, Chemical equilibrium, Oxidation-reduction reactions, Sweden.
Identifiers: Potentiometric titration.

The calorimeter for enthalpy titration constructed by Schlyter (Trans. Roy. Inst. Tech., Stockholm n132 1959) was modified: the temperature measuring device now consists of a thermistor resistance is measured using an amplifier as a null instrument. This method is thought to be more convenient than the 'deflection method' used by Schlyter. By means of enthalpy titration the enthalpy changes in (kcal/mol) for the stepwise formation of Cl (-)-Hg (2+) and Br (-)-Hg (2+) complexes were measured. From the enthalpy titrations it was also possible to obtain values for some of the equilibrium constants. A determination of all the equilibrium constants was performed independently by emf methods. (Author)
AD-653 429 Not available from CFSTI.

ON THE NATURE OF CHARGE-CARRIERS IN LIQUID Se CONTAINING Cl,
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
Margareta Lundkvist, and Lars Gunnar Sillen.
29 Jul 66, 4p
AFOSR-67-1311
Grant AF-EOAR-22-65
Availability: Published in Acta Chemica Scandinavica v20 n6 p1723-4 1966.

Descriptors: (*Selenium, *Carriers (Semiconductors)), Electrical conductance, Liquids, Chlorine, Charged particles, Selenium compounds, Chlorides, Sweden.
Identifiers: Selenium chlorides.

A chemical approach was used to investigate the nature of the charge-carriers in liquid selenium containing chlorine. From a plot of log of conductance versus log of pressure of SeCl2 it was concluded that each SeCl2 gives four charged particles. This may be expressed in the following chemical equation: Se (l) + SeCl2 (g) = 2Se (+) + 2Cl (-). The 'chemical' picture is compared to the 'physical' picture of electron holes and of excess electrons, connected with chlorine atoms. (Author)
AD-653 431 Not available from CFSTI.

ENERGY CALCULATION OF THE METASTABLE (1s2s2p)4Po STATE OF He (-) AND Li,
Oslo Univ (Norway) Inst for Theoretical Physics
E. Holoeien, and J. Midtdal. 22 Dec 66, 4p
AFOSR-67-1308
Grant AF-EOAR-33-66
Availability: Published in Proc. Phys. Soc., v90 p883-5 1967.

Descriptors: (*Atomic energy levels, Matrix algebra), (*Helium, Atomic energy levels), (*Lithium, Atomic energy levels), Kinetic energy, Hamiltonian, Vector analysis, Functions, Set theory, Sweden.

Owing to a mistake in algebra made by Holoein and Midtdal in 1955 (Proc. Phys. Soc. A v68 p815) when evaluating the matrix elements of the kinetic energy part of the Hamiltonian operator, the numerical values obtained for the energy and the coefficients of the corresponding eigenvector are in error. The error is associated only with correlated basis functions because the correction term vanishes for those which are non-correlated. The corrected values obtained by the re-examination for lithium are more consistent with recent results from electron-impact experiments. New results for the energy are given for a 15th-order subset both for He (-) and Li. (Author)
AD-653 433 Not available from CFSTI.

PHOTOCURRENTS AT A METAL-ELECTROLYTE INTERFACE.
New York Univ N Y Dept of Chemistry
For primary bibliographic entry see Field 7E.
AD-653 453 Not available from CFSTI.

THE INFLUENCE OF SURFACE-ACTIVE MATERIAL ON THE PROPERTIES OF AIR BUBBLES AT THE AIR/SEA INTERFACE,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 8J.
AD-653 458 HC$3.00 MF$0.65

STEREOCHEMICAL EQUILIBRIUM IN CHAIN MOLECULES,
Naval Research Lab Washington D C
Paul J. Flory. 28 Nov 66, 9p
AFOSR-67-1296
Contract AF 49 (638)-1341
Availability: Published in Journal of the American Chemical Society v89 n8 p1798-1804 Apr 12 1967.

Descriptors: (*Polymers, Stereochemistry), (*Stereochemistry, Chemical equilibrium), Vinyl plastics, Molecular rotation, Matrix algebra, Molecular weight, Statistical distributions, Acrylic resins.
Identifiers: Molecular conformations.

A general theory of stereochemical equilibria in chain molecules possessing two or more asymmetric centers is presented. It is applied to vinyl polymers CH3- (CHR-CH2)x-H and their low molecular homologs in the presence of a catalyst capable of effecting racemization of the -CHR- centers. The relative abundance of each stereoisomeric species is proportional to the sum of the statistical weights for all of its rotational conformers, i.e., to the statistical mechanical configuration partition function Z for the species. The relevant partition function Z for the equilibrated system is the sum of the Z's for all stereoisomeric species. It is expressed without approximation in terms of statisti-

cal weight parameters for rotational isomeric states, with due account of neighbor effects. Equilibrium populations of various dyads, triads, and higher sequences are readily derived for chains of any length. The stereochemical configuration of a given unit in a chain of many units is shown to depend not only on the symmetries of its immediate neighbors, but also on centers many units removed. The theory departs therefore from the statistics for an Ising lattice with first-neighbor dependence. Dyad and triad compositions of dimeric and trimeric homologs cannot in general be construed as being representative of infinite chains, as is shown by trial calculations. In general, the statistical distribution of symmetries of consecutive asymmetric centers is neither Bernoullian nor Markoffian. Available experimental results are interpreted according to the theory. (Author)
AD-653 477 Not available from CFSTI.

ESTUDIOS SOBRE HIDROLISIS DE IONES METALICOS 55. VANADIO (III) EN MEDIO (K)Cl 3M (Studies Concerning Hydrolysis of Metallic Ions 55. Vanadium (III) in 3 Molar KCl Medium),
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
Felipe Brito. 1966, 6p
AFOSR-67-1294
Grants AF-EOAR-22-65, AF-EOAR-8-63
Text in Spanish, summary in English. See also AD-622 889.
Availability: Published in Anales de la Real Sociedad Espanola de Fisica y Quimica Serie B-QU1M-ICA v62B n2 p193-6 Feb 1966.

Descriptors: (*Vanadium, Hydrolysis), Electrolytes, Potassium compounds, Chlorides, pH, Chemical equilibrium, Stability, Sweden.

The hydrolysis of vanadium (III) was studied at 25C in the ionic medium 3M (K)Cl by measuring the hydrogen ion concentration with hydrogen and glass electrodes, which together gave concordant results. The (V (III)) ranged from 0.020 to 0.100 M and Z, the average number of hydrogen ions set free per vanadium atom, from values high enough for hydrolysis to be negligible to values nearly one. An analysis of the data, using the computer program Letagropvrid, indicated the following equilibria and stability constants: V (3+) + H2O = VOH (2+) + H (+), log K11 = 3.07 plus or minus 0.09; 2V (3+) + 2H2O = V2 (OH)2 (4+) + 2H (+), log K22 = 3.96 plus or minus 0.07; V (3+) + 2H2O = V (OH)2 (+) + 2H (+), log K21 approx. = 7.5 (>7.0); 2V (3+) + 3H2O = V2 (OH)3 (3+) + 3H (+), log K32 approx. = 8.7 (>8.0). (Author)
AD-653 481 Not available from CFSTI.

S7UDY ON THE HYDROLYSIS OF METAL IONS. PART 56. SOLVENT EXTRACTION STUDY OF THE HYDROLYSIS OF ZINC (II) IN 3 M NaClO4 AT LOW CONCENTRATION,
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
Tatsuya Sekine. 10 May 65, 16p
AFOSR-67-1307
Grants AF-EOAR-22-65, AF-EOAR-8-63
See also AD-653 481.
Availability: Published in Acta Chemica Scandinavica v19 n7 p1526-38 1965.

Descriptors: (*Hydrolysis, Metals), (*Zinc, Hydrolysis), Solvent extraction, Chemical equilibrium, Hydroxides, Tracer studies, Sodium compounds, Perchlorates, Sweden.
Identifiers: Zinc hydroxide.

The mononuclear hydrolysis of Zn (II) in 3 M NaClO4 was studied by a distribution method. The mononuclear species, Zn (OH)2, was extracted into a benzene phase containing 5% (by volume) of the long-chain liquid amine Amberlite LA-1. The net distribution ratio of Zn (II) could be explained by the relation D = (Zn (II)) org, total/ (Zn (II)) aq, total = (Zn (OH)2L2) org/ (Zn (2+)) + (Zn (OH)2) + (Zn (OH)3) + (Zn (OH)4 (2-)) where L denotes the amine. The hydrolysis constants and the distribution constant of the Zn (OH)2 species between the organic and the aqueous phases were calculated by a generalized least squares method, using the LETAGROP VRID computer program. (Author)
AD-653 484 Not available from CFSTI.

ESTUDIOS SOBRE EQUILIBRIOS DE POLIANIONES. XIII. POLIMERIZACION DE LOS TELURATOS EN NaCl 1 M y 25 DEGREES (Studies Concerning the Equilibria of Polyanions. XIII. Polymerization of Tellurates in one Molar NaCl Solution at 25 Degrees C),
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
Felipe Brito. 1966, 6p
AFOSR-67-1306
Grants AF-EOAR-22-65, AF-EOAR-8-63
Text in Spanish, summary in English.
Availability: Published in Anales de la Real Sociedad Espanola de Fisica y Qyimica Serie B-QU1M-ICA v62B n2 p197-8 Feb 1966.

Descriptors: (*Chemical equilibrium, Inorganic polymers), (*Tellurium compounds, Polymerization), (*Inorganic acids, Polymerization), Ions, pH, Concentration (Chemistry), Stability, Hydrolysis, Sweden.
Identifiers: Telluric acid.

The hydrolysis of telluric acid was studied in 1M NaCl ionic medium. The H (+) concentration was measured using a glass electrode. B, the total tellurium concentration and Z, the number of H (+) split off per tellurium atom, were varied as follows: (0.005 M, < or = 0.8), (0.010, < or = 0.8), (0.046 < or = 0.5), (0.100, < or = 0.4) and (0.200, < or = 0.3). An analysis of the data by means of the computer program Letagrop (2), indicated the following equilibria and stability constants (B=Te (OH)6): B + H2O = BOH (-) + H (+), log K11 = 7.32 plus or minus 0.02; 2B + H2O = B2OH (-) + H (+), log K12 = 6.25 plus or minus 0.03; 2B + 2H2O = B2 (OH)2 (2-) + 2H (+), log K22 = 13.23 plus or minus 0.03. (Author)
AD-653 485 Not available from CFSTI.

ESTUDIOS SOBRE EQUILIBRIOS DE POLIANIONES. XIV. VANADATOS EN LA REGION DE INESTABILIDAD, 40C Y Na (Cl) 0.5 M (Studies Concerning the Equilibria of Polyanions. XIV. Vanadates in the Instability Range, 40C and Na (Cl) 0.5 M),
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
Felipe Brito. 1966, 18p
AFOSR-67-1293
Grant AF-EOAR-8-63
See also AD-653 485.
Availability: Published in Anales de la Real Sociedad Espanola de Fisics y Quimica Serie B-QU1M-ICA v62B n2 p123-38 Feb 1966.

Descriptors: (*Chemical equilibrium, Inorganic polymers), (*Vanadates, Chemical equilibrium), Ions, Stability, Sodium chloride, Concentration (Chemistry), Complex compounds, Sweden.

Equilibria in vanadate solutions was studied at 40C and with 0.5 M Na (Cl) as ionic medium for an average charge per vanadium atom, z, ranged from -0.6 to -1.0, which cover the 'instability range'. The charge z was determined as function of h, proton concentration in equilibrium, for various total concentration, B, of vanadium between 0.018 and 0.100M. h was measured using a glass electrode. (Author)
AD-653 486 Not available from CFSTI.

ON A PHOTOMETRIC METHOD FOR CONCENTRATION DETERMINATIONS,
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
Tom Wallin. 13 Sep 66, 17p
AFOSR-67-1291
Grant AF-EOAR-63-8
Availability: Published in Arkiv fuer Kemi v26 n2 p13-26 1966.

Descriptors: (*Concentration (Chemistry), Optical analysis), (*Chemical indicators, Chemical equilibrium), Spectrophotometers, Photomultipliers, Absorption spectrum, Standards, PH, Perchloric acid, Sodium compounds, Perchlorates, Sweden.

A null method for photometric concentration determinations is described. The apparatus consists of a double-beam spectrophotometer equipped with a single photomultiplier and a zero detector. The light absorbance of the sample solution with that of a reference solution of known composition having an identical absorbance curve in the wavelength range studied so that the influence of stray light, reflexion and drift, which are unavoidable in conventional spectrophotometric absorbance determinations can be eliminated. Absorbance differences of less than 0.02% can easily be detected. It may be concluded on the basis of series of measurements of test solutions with standardized HClO4 that hydrogen in concentration can be determined with a mean error less than 0.1%. Titration cells are used to make stepwise changes in the composition of the sample solution and the reference solution under inert atmosphere and with the two cells fixed in the light beams. The use of the method in equilibrium studies is briefly discussed. Equilibrium constants for some pH indicators were determined in 2M or 3M (Na (+))ClO4 (-) at 25C. (Author)
AD-653 492 Not available from CFSTI.

THE ION ACTIVITY FUNCTION - AN APPROACH TO THE STUDY OF ELECTROLYTE BEHAVIOUR IN CONCENTRATED SOLUTIONS,
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
L. Leifer, and E. Hoegfeldt. 1963, 11p
AFOSR-67-1292
Contracts AF 61 (052)-162, AT (30-1)-905
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge.
Availability: Published in Electrochemistry, Proceedings of the Australian Conference n1 p107-14 13-15, 18-20 Feb, 1963.

Descriptors: (*Electrolytes, Interactions), (*Acid-base equilibrium, Measurement), (*Perchlorates, Chemical equilibrium), Hydrolysis, Solutions, Concentration (Chemistry), pH, Water, Hydrochloric acid, Dissociation, Magnesium compounds, Calcium compounds, Strontium compounds, Barium compounds, Lead compounds, Sweden.
Identifiers: Barium perchlorate, Calcium perchlorate, Lead perchlorate, Magnesium perchlorate, Strontium perchlorate.

An approach is presented to interactions in concentrated electrolyte solutions. Combination of Hammett acidity and activity data permit the determination of ion activity and ion activity coefficient functions for the ions in several divalent metal perchlorate-water systems as well as in hydorchloric acid-water mixtures. The fact that a unique ion activity function was obtained for H3O (+) in several strong acids permits the calculation of at least approximate values for ionic hydration as a function of composition. Further, the results indicate the marked stability of H9O4 (+) in concentrated HCl solutions and a likely mechanism for the acid dissociation. (Author)
AD-653 502 Not available from CFSTI.

IONIC-MOLECULAR REACTIONS OF HYDROGEN WITH NOBLE GASES,
Foreign Technology Div Wright-Patterson AFB Ohio
M. V. Tikhomirov, G. E. Spezhakova, and N. N.

Tunitskii. 23 Mar 67, 16p Rept no. FTD-MT-65-547
TT-67-62098
Edited Machine trans. of mono. Ionno-Molekulyamye Reaktsii Vodoroda s Blagorodnymi Gazami, Moscow, 1965 11p. Mezhdunarodnyi Simposium po Svoistvam i Primeneniyu Nizhotemperaturnoi Plasmy. Mezhdunardodnom Kongresse po Teoreticheskoi Prikladnoi Khimii, 20.

Descriptors: (*Helium group gases, Chemical reactions), (*Helium, *Hydrogenation), Hydrogen, Ions, Deuterated compounds, Molecular association, Plasma medium, USSR.
Identifiers: Helium group compounds.

The dependence of the yield of HeH (+) and HeD (+) ions on the energy of ionizing electrons in ionic-molecular reactions is investigated. It is shown that the relative yield of HeH (+) ions decreases in the electron energy field from 25 to 17 ev, and the ratio HeH (+)/HeD (+) is constant and approximately equal to 0.8 when the energy changes from 70 to 25 ev. The dependence of a cross section of a reaction on the vibrational state of an H2 (+) ion is investigated in accordance with O. B. Firsov's ionic-molecular reaction theory. It is shown that an intermediate complex of this reaction decomposes into initial products with great probability, which decreases the HeH (+) yield. The experimental dependence of the HeH (+) yield on electron energy agrees with the theory. (Author)
AD-653 510 HC$3.00 MF$0.65

THE ROLE OF METASTABLE, NEUTRAL ELECTRONICALLY EXCITED SPECIES IN ATMOSPHERIC DEIONIZATION.
General Electric Co Philadelphia Pa Missile and Space Div
For primary bibliographic entry see Field 4A.
AD-653 516 HC$3.00 MF$0.65

SYNTHESIS OF ACETYLENE IN A PLASMA JET,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-653 539 HC$3.00 MF$0.65

FIELD THEORETIC APPROACH TO ATOMIC HELIUM,
Uppsala Univ (Sweden) Quantum Chemistry Group
For primary bibliographic entry see Field 20J.
AD-653 562 Not available from CFSTI.

OPEN AND CLOSED SHELL STATES IN FEW-PARTICLE QUANTUM MECHANICS,
Uppsala Univ (Sweden) Quantum Chemistry Group
For primary bibliographic entry see Field 20J.
AD-653 567 Not available from CFSTI.

APPROXIMATION BY A SINGLE SLATER DETERMINANT,
Uppsala Univ (Sweden) Quantum Chemistry Group
For primary bibliographic entry see Field 20J.
AD-653 570 Not available from CFSTI.

NATURAL SPIN ORBITALS FOR SOME LITHIUM WAVEFUNCTIONS CONTAINING EXPLICITLY INTERELECTRONIC COORDINATES,
Uppsala Univ (Sweden) Quantum Chemistry Group
For primary bibliographic entry see Field 20J.
AD-653 574 Not available from CFSTI.

ATOM RECOMBINATION PART I. HALOGEN ATOMS; PART II. SINGLET MOLECULAR OXYGEN.
Final scientific rept., Jan 63-Apr 67,
British Columbia Univ Vancouver Dept of Chemistry
E. A. Ogryzlo. Jun 67, 33p
AFOSR-67-1290
Grants AF-AFOSR-158-63, AF-AFOSR-158-65

Descriptors: (*Recombination reactions, Reaction kinetics), (*Halogens, Recombination reactions), (*Oxygen, Recombination reactions), Chlorine, Bromine, Iodine, Luminescence, Molecular energy levels, Ground state, Excitation, Electric discharges, Calorimetry, Spectroscopy, Disproportionation, Ozone, Dissociation, Emissivity, Canada.

The research includes an investigation of the complex mechanisms involved in the recombination of certain atoms, halogens and oxygen. Electrical discharge produced the atoms and their concentration was measured as a function of time by a titration procedure and with an isothermal calorimetric atom-detector. Major conclusions resulting from this investigation are: (1) Excited oxygen molecules can be prepared with an electrical discharge. Kinetic studies with these species are possible since the concentration of species as a function of time can be measured calorimetrically or spectroscopically. (2) The excited molecules of O2 are formed in an energy disproportionation process. (3) Two molecules of oxygen can combine their energies and emit it as a single photon. The temperature dependence of the rate constant indicates that the emission comes from a colliding pair of molecules. (4) O2 can dissociate ozone. (5) The dissociation of molecular iodine atoms with the oxygen molecule was observed. (Author)
AD-653 611 HC$3.00 MF$0.65

FOG DISPERSAL EXPERIMENTS USING PROPANE AT WALLA WALLA, WASHINGTON.
Cold Regions Research and Engineering Lab Hanover N H
For primary bibliographic entry see Field 1E.
AD-653 636 HC$3.00 MF$0.65

EFFECT OF TRANSLATIONAL ENERGY ON ION-MOLECULE REACTION RATES,
Aerospace Research Labs Wright-Patterson AFB Ohio
Jean H. Futrell, and Fred P. Abramson. 3 May 66, 28p Rept no. ARL-67-0026
Availability: Published in Advances in Chemistry Series n58 p107-30 1966.

Descriptors: (*Reaction kinetics, Kinetic energy), (*Ions, Reaction kinetics), Ion sources, Helium group gases, Hydrogenation, Oxidation-reduction reactions, Probability, Hydrogen, Deuterated compounds, Exchange reactions, Methane, Hydrocarbons, Reviews.
Identifiers: Translational energy.

The kinetic energy dependence of ion-molecule reaction rates is reviewed from both experimental and theoretical viewpoints for typical systems. At low energy the theory of Gioumousis and Stevenson is an adequate framework when suitably modified to reflect characteristic properties of a given system. At higher energies it is necessary to invoke orientation effects appropriate to stripping mechanisms to rationalize experimental data. New information on energy dependent isotope effects and multiple dissociation paths for intermediate complexes provide suitable criteria for distinguishing the two fundamental mechanisms and also demonstrate the efficient conversion of translational energy into internal energy. On the basis of these results, certain particularly important areas for future research are suggested. (Author)
AD-653 652 Not available from CFSTI.

ELECTRON COLLISIONS WITH IONS OF THE 3P (3) CONFIGURATION,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3B.
AD-653 661 Not available from CFSTI.

TANDEM MASS SPECTROMETER FOR STUDY OF ION-MOLECULE REACTIONS,
Aerospace Research Labs Wright-Patterson AFB Ohio
Jean H. Futrell, and C. D. Miller. 6 Jun 66, 10p
Rept no. ARL-67-0092
Availability: Published in Review of Scientific Instruments v37 n11 p1521-6 Nov 1966.

Descriptors: (*Mass spectroscopy, Instrumentation), (*Spectrometers, Design), (*Ion beams, Interactions), Ions, Chemical reactions, Exchange reactions, Ion sources, Momentum, Helium group gases, Hydrogenation.

An instrument for the study of ion-neutral interactions involving momentum transfer to the product ions was constructed. It consists of a double focusing mass spectrometer which serves as an ion source for a collision chamber connected to a second double focusing mass spectrometer. This instrument provides both mass and energy resolution of the impacting ion beam and the in-line configuration maximizes collection of momentum transfer products, as from ion-molecule reactions. Ion beams of experimentally useful intensity are produced over the energy range 0.2 to 100 eV with an energy spread of 0.3 eV. (Author)
AD-653 666 Not available from CFSTI.

ELECTROCHEMICAL BEHAVIOR OF METALS AS STIMULUS ELECTRODES,
State Univ of New York Stony Brook
For primary bibliographic entry see Field 6L.
AD-653 682 Not available from CFSTI.

DERIVATION OF EXPRESSIONS FOR CALCULATION OF LIMITING DETECTABLE ATOMIC CONCENTRATION IN ATOMIC FLUORESCENCE FLAME SPECTROMETRY.
Revised ed.,
Florida Univ Gainesville Dept of Chemistry
J. D. Winefordner, M. L. Parsons, J. M. Mansfield, and W. J. McCarthy. 1 Feb 67, 10p
AFOSR-67-1302
Grant AF-AFOSR-1033-67
Revision of manuscript submitted 21 Apr 66.
Availability: Published in Analytical Chemistry v39 n4 p436-42 Apr 1967.

Descriptors: (*Atomic spectroscopy, *Concentration (Chemistry)), Flames, Fluorescence, Signal-to-noise ratio, Excitation, Line spectrum, Continuous spectrum, Instrumentation, Monochromators, Amplifiers.
Identifiers: Flame spectroscopy.

An expression for the limiting detectable atomic concentration in atomic fluorescence flame spectrometry is derived using signal-to-noise ratio theory. The variation of the limiting detectable atomic concentration is considered with respect to the type of source of excitation (narrow line or continuous), the source intensity and flicker, the flame background intensity and flicker, the power efficiency of the fluorescence to absorption transitions, the monochromator slit width, the frequency response bandwidth of the amplifier-readout system, and the amplifier type (d.c. or a.c.). Values of the limiting detectable atomic concentration are given for Cd-2288A, Cu-3248A, and Na-5890A as a function of the above parameters for a practical and useful experimental system. Correlation of the limiting detectable atomic concentration to the limiting detectable solution concentration is also considered. (Author)
AD-653 683 Not available from CFSTI.

FREE ENERGY OF FORMATION OF CUPRIC OXIDE,
Revised ed.,
Aerospace Research Labs Wright-Patterson AFB Ohio
L. R. Bidwell. 19 Aug 66, 6p Rept no. ARL-67-0034
Revision of manuscript received 13 Jun 66.
Availability: Published in Journal of Electrochemical Society v114 n1 p30-1 Jan 1967.

Descriptors: (*Copper compounds, Oxidation), (*Free energy, Copper compounds), Oxides, Synthesis (Chemistry), Thermochemistry, Heat of formation, Electrolytic cells, Chemical equilibrium.
Identifiers: Cupric oxide.

The standard molar free energy change for the oxidation of cuprous oxide to cupric oxide was determined over the temperature range 973-1273K using galvanic cells employing calcia stabilized zirconia as the electrolyte. The measurements predict a temperature of 1298K for the decomposition of cupric oxide in air, in good agreement with the generally accepted value of 1299K. The standard molar free energies of formation of cupric oxide were calculated from the experimental data using previously determined values for the standard molar free energy of formation of Cu2O. The results can be represented by as -35,750 + 19.97T plus or minus 100 cal/mole, which is somewhat less negative than values estimated from calorimetric and dissociation pressure measurements. (Author)
AD-653 703 Not available from CFSTI.

REACTIONS OF C3E6 (+) WITH C3 AND C4 PARAFFINS,
Aerospace Research Labs Wright-Patterson AFB Ohio
J. Wayne Sieck, and J. H. Futrell. Dec 66, 9p
Rept no. ARL-66-0248
Availability: Published in Journal of Chemical Physics v45 n2 p5604 Jul 1966.

Descriptors: (*Alkanes, Chemical reactions), (*Propenes, Recombination reactions), (*Cyclopropanes, Recombination reactions), Ionization, Photolysis, Reaction kinetics, Molecular isomerism, Exchange reactions, Probability.

Rate constants for H (-) and H2 (-) transfer from C3 and C4 paraffins to propylene and cyclopropane molecular ions have been determined for ions of low translational energy at the ionization threshold of C3H6 (+). The results indicate that an increase in KH (-) is accompanied by a compensating decrease in KH2 (-) and vice versa, such that the total reactivity of C4 structural isomers in invariant. By using selectively labeled compounds, it was possible to derive transfer probabilities for the various substituent sites on the normal butane carbon skeleton. Evidence is also presented which suggests that cyclopropane molecular ions do not assume the propylene-ion structure prior to or during reaction with C4 paraffins. The results of the present investigation are compared with some complementary data obtained from radiolytic and photolytic systems at much higher pressures. (Author)
AD-653 705 Not available from CFSTI.

SCATTERING OF THERMAL ENERGY GAS BEAMS BY METALLIC SURFACES II,
United Aircraft Corp East Hartford Conn Research Labs
John J. Hinchen, Evelyn S. Malloy, and James B. Carroll. Jun 67, 99p Rept no. UACRL-F910439-7
Contract NOw-66-0228

Descriptors: (*Scattering, *Molecular beams), (*Helium group gases, Molecular beams), (*Vacuum apparatus, Molecular beams), Platinum, Intensity, Tantalum, Surface roughness, Contamination, Theory, Electron microscopy, Heat transfer, Nitrogen, Oxygen, Methane, Water vapor, Momentum, Space flight, Metals, X-ray diffraction analysis.

Scattering of molecular gases from platinum and tantalum was studied using an ultra-high vacuum molecular beam apparatus. Beams of the rare gases, nitrogen, oxygen, methane and water vapor were used. The angle of maximum intensity of the scattered gas beams had a dependency on experimental variables that was in fair agreement with theory. Surface contamination and roughness affected the intensity and spatial distribution of scattered beams, but no difference between polycrystalline and single crystal metal surfaces was observed. By using phase-sensitive-detection techniques, the velocity of scattered molecules was found to vary with angular position about the surface. Energy and momentum coefficients were evaluated from the experimental data. Under certain conditions, discontinuities and negative values were found for these coefficients; such excursions in energy accommodation have been theoretically predicted. The experimental results were used in analysis of free molecule and slip flows. (Author)
AD-653 720 HC$3.00 MF$0.65

CHEMICAL PHYSICS OF SURFACE REACTIONS OF METALS.
Westinghouse Research Labs Pittsburgh Pa
For primary bibliographic entry see Field 11F.
AD-653 723 HC$3.00 MF$0.65

STRUCTURE STUDY OF LIQUID GALLIUM AND MERCURY BY NUCLEAR MAGNETIC RESONANCE.
Revised ed.,
California Univ Berkeley Dept of Physics
David A. Cornell. 21 Sep 66, 9p
Revision of manuscript submitted 29 Dec 65. Research supported in part by ONR.
Availability: Published in Physical Review v153 n1 p208-16 Jan 5 1967.

Descriptors: (*Liquid metals, *Nuclear magnetic resonance), (*Gallium, Nuclear magnetic resonance), (*Mercury, Nuclear magnetic resonance), Electrons, Magnetic fields, Temperature, Volume, Hyperfine structure, Relaxation time, Diffusion, Molecular association, Isotopes.
Identifiers: Knight shift.

The Knight shift in pure liquid gallium is measured as a function of temperature between 300 and 740K and is found to obey the empirical relation for change with temperature, K = - (2.95 plus or minus 0.15) x 10 to the -7th power (T-300K). These data agree with and extend the earlier measurements of McGarvey and Gutowsky, who interpreted their results as being in qualitative agreement with free-electron theory. In the present work the shift is found to vary only slightly with volume, according to the expression K (V)=0.00449 (V/V0) exp. -0.1 plus or minus 0.1 at pressures between 1 and 5000 kg/sq. cm. The nuclear relaxation times T1 and T2 are measured from 270 to 470K in gallium and from 233 to 356K in mercury. The relaxation rate 1/T1 is divisible into a magnetic hyperfine part and a quadrupolar part. The magnetic part is consistent with the Korringa-Pines theory. The quadrupolar part is explained according to the theory of relaxation by atomic diffusion; good estimates are obtained by using correlation times equal to jump diffusion times reduced by a vacancy fraction of about 0.1 and quadrupole coupling calculated using a single void space at a neighbor position on a quasilattice. The quadrupolar coupling increases with temperature, if the correlation time for the interaction is assumed to be governed by diffusion processes. The experimental relaxation rates 1/T1 (/sec) for gallium and mercury are most simply expressed as a function of temperature in the range of the measurements: Ga69, 3.3T + (800-0.67T); Ga71, 5.3T + (320-0.27T); Hg199, 63T; Hg201, 8.9T + (69 000-80T). (Author)
AD-653 754 Not available from CFSTI.

TIME-OF-FLIGHT ELECTRON VELOCITY SPECTROMETER,
General Electric Co Schenectady N Y Research and Development Center
For primary bibliographic entry see Field 14B.
AD-653 758 Not available from CFSTI.

DIRECT SPIN-LATTICE RELAXATION OF DIVALENT COBALT IONS IN TWO HYDRATED COMPLEXES.
Kansas Univ Lawrence Dept of Physics and Astronomy
For primary bibliographic entry see Field 20L.
AD-653 760 Not available from CFSTI.

ELECTRIC-FIELD-INDUCED TRANSITIONS IN THE ELECTRON PARAMAGNETIC RESONANCE OF NON-KRAMERS DOUBLETS,
Kansas Univ Lawrence Dept of Physics and Astronomy
For primary bibliographic entry see Field 20L.
AD-653 763 Not available from CFSTI.

THE ANODIC DISSOLUTION OF CADMIUM.
Technical rept.,
Missouri Univ Rolla Graduate Center for Materials Research
J. W. Johnson, E. Deng, S. C. Lai, and W. J. James. 18 Jan 67, 7p Rept no. TR-18, Paper-15
Contract Nonr-2296 (03)
Revision of manuscript submitted 14 Nov 66.
Availability: Published in Journal of the Electrochemical Society v114 n5 p424-8 May 1967.

Descriptors: (*Cadmium, Electrolysis), (*Anodes (Electrolytic cells), Cadmium), Electrolytes, Chlorides, Bromides, Iodides, Acetates, Sulfates, Nitrates, Valence, Solutions, Corrosion, Degradation.

The anodic dissolution of cadmium was studied in aqueous solutions containing Cl (-), Br (-), I (-), Ac (-), SO4 (=), and NO3 (-) ions. The normal valence (+2) was found in all solutions with the exception of NO3 (-). The apparent valence (calculated) of cadmium ions in nitrate solutions varied from 1.2 to 2.0 and was found to be a function of NO3 (-) concentration, current density, and temperature. An anodic dissolution mechanism is proposed involving local corrosion and disintegration of the anode which is consistent with the experimental results. (Author)
AD-653 766 Not available from CFSTI.

LITHIUM-MOIST AIR BATTERY.
Globe-Union Inc Milwaukee Wis Applied Research Labs
For primary bibliographic entry see Field 10C.
AD-653 774 HC$3.00 MF$0.65

HIGH ENERGY ELECTROCHEMICAL COUPLES. II. GAS ELECTRODES IN ORGANIC SOLVENTS.
American Univ Washington D C
For primary bibliographic entry see Field 10C.
AD-653 779 HC$3.00 MF$0.65

NON-AQUEOUS ELECTROLYTE SYSTEMS.
California Univ Los Angeles Dept of Engineering
For primary bibliographic entry see Field 10C.
AD-653 799 HC$3.00 MF$0.65

ON THE STATISTICAL INTERPRETATION OF THERMODYNAMIC ENTROPY IN A STRONGLY COUPLED GAS,
Brussels Univ (Belgium) Faculte des Sciences
For primary bibliographic entry see Field 20M.
AD-653 815 Not available from CFSTI.

COLLISION-INDUCED DISSOCIATION OF D2 (+) IONS BY ARGON AND NITROGEN,
Florida Univ Gainesville Dept of Physics and Astronomy
R. L. Champion, L. D. Doverspike, and T. L. Bailey. 21 Jun 66, 10p
AFOSR-67-1375
Grant AF-AFOSR-471-64
Supported in part by NASA.
Availability: Published in The Journal of Chemical Physics v45 n12 p4377-84 Dec 15 1966.

Descriptors: (*Deuterium, Dissociation), (*Argon, Gas ionization), (*Nitrogen, Gas ionization), Ion beams, Scattering, Instrumentation, Molecular energy levels, Excitation, Interactions, Probability.

The reactions D2 (+) + X to D (+) + D + X, where X is Ar or N2, were studied with an angular ion-scattering apparatus at ion laboratory energies in the range 5-120 eV. Kinetic-energy distributions as well as angular distributions of the product D (+) ions have been determined. The experimental method consists of directing a well-collimated, mass-analyzed, and energy-selected ion beam into a scattering region and analyzing the product ions with a 127 deg. electrostatic velocity selector and a radio-frequency mass filter. The product ion analysis and detections system rotates about the center of the scattering region. The results are discussed in terms of a simple two-step collision model, where the D2 (+) ion is first excited electronically to the antibonding (2)Sigma-mu state, and then dissociates. The possibility of direct excitation of the D2 (+) ion into the vibrational continuum is also discussed. If either model is assumed for the reaction, the experimental results indicate that the most probable reaction channel for the collision-induced dissociation reaction is one in which primary D2 (+) ions with large vibrational energies give rise to D and D (+) products which separate with small relative velocities. These results are consistent with some existing opinion that the collision-induced dissociation cross section increases rapidly as the vibrational excitation of the primary ion is increased. (Author)
AD-653 823 Not available from CFSTI.

ENERGETIC AND ANGULAR STUDIES OF ArD (+) AND N2D (+) FORMATION,
Florida Univ Gainesville Dept of Physics and Astronomy
L. D. Doverspike, R. L. Champion, and T. L. Bailey. 21 Jun 66, 8p
AFOSR-67-1374
Grant AF-AFOSR-471-64
Research supported in part by NASA.
Availability: The Journal of Chemical Physics v45 n12 p4385-91 Dec 15 1966.

Descriptors: (*Deuterium, Ion bombardment), (*Argon, Chemical reactions), (*Nitrogen, Chemical reactions), Deuterated compounds, Ions, Synthesis (Chemistry), Ion beams, Scattering, Energy, Momentum, Molecular energy levels, Excitation, Complex compounds.

The reactions of argon and nitrogen positive ions on molecular deuterium targets were investigated over the 2-100 eV range. Kinetic-energy distributions as well as angular distributions of the product ions were determined. The Q values for both reactions are endothermic over the entire energy range of these experiments, being approximately zero at the lowest energies and exhibiting endo-thermic maxima in the region 50<E1<60 eV, the maxima corresponding to excited intermediates. The experimental results indicate the reactions proceed according to a 'pickup' mechanism at moderate collision energies and that at very low collision energies a complex formation becomes important. (Author)
AD-653 824 Not available from CFSTI.

INFRARED SPECTRA AND STRUCTURE OF SILICON COBALT TETRACARBONYLS,
Pennsylvania Univ Philadelphia John Harrison Lab of Chemistry
Arnulf P. Hagen, and Alan G. MacDiarmid. 11 Jul 66, 7p
AFOSR-67-1367
Contract AF 49 (638)-1519
Availability: Published in Inorganic Chemistry v6 n4 p686-9 Apr 1967.

Descriptors: (*Cobalt compounds, Molecular structure), (*Silicon compounds, Molecular structure), Fluorine compounds, Spectra (Infrared), Chemical bonds.
Identifiers: Silicon cobalt tetracarbonyls.

The new compound, F3SiCo (CO)4 was synthesized by the high-pressure reaction of HSiF3 with Co2 (CO)8. The high-resolution gas-phase infrared spectra of Cl3SiCo (CO)4 and of the new compounds F3SiCo (CO)4, (CH3)3SiCo (CO)4, and H3CSiH2Co (CO)4 were examined in the CO stretching region. The spectra are consistent with trigonal-bipyramidal type molecular structures in which the silicon substituent occupies an axial position. The data obtained suggest that there may be significant (d yields d)-pi double-bond character in the silicon-cobalt bond in silicon cobalt tetracarbonyls. The above structural-bonding conclusions are consistent with a single crystal x-ray investigation of a sample of Cl3SiCo (CO)4. (Author)
AD-653 829 Not available from CFSTI.

THE ELECTROMAGNETIC ACTIVITY OF PORPHIN DERIVATIVES.
Pennsylvania Univ Philadelphia John Harrison Lab of Chemistry
For primary bibliographic entry see Field 7C.
AD-653 842 HC$3.00 MF$0.65

CRYSTAL CHEMISTRY AT ELEVATED PRESSURE AND MODERATE TEMPERATURES.
Pennsylvania State Univ University Park Materials Research Lab
For primary bibliographic entry see Field 20B.
AD-653 887 HC$3.00 MF$0.65

GEOMETRY OF THE TRANSITION-METAL DIHALIDES: THE FLUORIDES OF MANGANESE, COBALT, NICKEL, COPPER, AND ZINC,
Little (Arthur D) Inc Cambridge Mass
Alfred Buechler, James L. Stauffer, and William Klemperer. 2 Mar 64, 7p
AROD-006:18
Contract DA-19-020-ORD-5584, ARPA Order-40-62
Availability: Published in The Journal of Chemical Physics v40 n12 p3471-4 Jun 15 1964.

Descriptors: (*Fluorides, Electric moments), (*Manganese compounds, Electric moments), (*Cobalt compounds, Electric moments), (*Nickel compounds, Electric moments), (*Copper compounds, Electric moments), (*Zinc compounds, Electric moments), Calcium fluorides, Mercury compounds, Mass spectrum, Molecular beams, Electric fields, Configuration, Molecular properties.
Identifiers: Cobaltous fluoride, Cupric fluoride, Manganous fluoride, Nickelous fluoride, Zinc fluoride.

The deflection of mass spectrometrically detected beams of CaF2, MnF2, MnCl2, CoF2, NiF2, CuF2, ZnF2, ZnCl2, and HgCl2 by an inhomogeneous electric field was examined. As found previously, (J. Chem. Phys. v39 p2023 1963), CaF2 deflects in the manner expected for a polar molecule. The remaining molecules listed were found to be nonpolar. These observations are interpreted to imply that while CaF2 has a nonlinear equilibrium geometry the remaining species are linear. The result for HgCl2 is in agreement with a number of previous electron diffraction and spectroscopic studies. (Author)
AD-653 888 Not available from CFSTI.

THE SOLID STATE CHEMISTRY OF HYDROGEN COMPOUNDS.
Technical progress rept. no. 6 (Final),
Arizona State Univ Tempe Dept of Chemistry
M. O'Keeffe. Jun 67, 48p
Contract Nonr-2794 (04)

Descriptors: (*Hydrogen, Chemical properties), (*Platinum, Permeability), Solids, Transition elements, Transport properties, Solubility, Crystal lattices, Thermodynamics, Deuterium, Alloys, Heat of solution, Nickel alloys, Palladium alloys, Hydrides, Protons, Diffusion.

Research on the interactions of hydrogen in solids is summarized and a bibliography of publications is given. New results are given for the permeation of hydrogen in platinum. An extensive account of the solubility of hydrogen in transition metals and alloys is presented. It is concluded that the screened-proton model gives the best account of hydrogen in these systems. (Author)
AD-653 891 HC$3.00 MF$0.65

THE THERMODYNAMICS OF THE MAGNESIUM SILICATE/MAGNESIUM-SILICON-OXYGEN VAPOR SYSTEM,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 11B.
AD-653 925 HC$3.00 MF$0.65

FIRST-ORDER WKBJ INTEGRALS FOR LENNARD-JONES (12,6) EXPONENTIAL (ALPHA,6) POTENTIALS,
Boeing Scientific Research Labs Seattle Wash Geo-Astro Physics Lab
Halstead Harrison. May 67, 17p Rept no. D1-82-0617

Descriptors: (*Molecular orbitals, Integrals), Diatomic molecules, Integrals, Potential energy, Molecular association, Functions, Algorithms, Tables.

Tables are presented which permit interpolation to give eigenenergies of diatomic molecules with Lennard-Jones (12,6) or exponential (alpha,6) interatomic potentials. (Author)
AD-653 948 HC$3.00 MF$0.65

THERMODYNAMIC PROPERTIES OF ORGANIC DERIVATIVES OF THE LIGHTER ELEMENTS.
Annual technical summary rept., 1 Mar 66-1 Mar 67,
Bureau of Mines Bartlesville Okla Petroleum Research Center
Donald R. Douslin, William D. Good, Herman L. Finke, Samuel S. Todd, and George B. Guthrie. 1 Mar 67, 22p
See also AD-635 296.

Descriptors: (*Ethyleneimines, Thermochemistry), (*Ethylenediamine, Thermochemistry), (*Amines, Thermochemistry), (*Halogenated hydrocarbons, Thermochemistry), Calorimetry, Vapor pressure, Entropy, Heat of combustion, Phase studies, Compressive properties, Fluorine compounds, Alkanes, Propanes, Butane, Benzenes, Liquid rocket fuels, Thermodynamics.
Identifiers: Butane diamines, Hexafluoro benzenes, Hexafluoro ethanes, Methylpropane diamines, Propane diamines.

Thermochemical research was carried out on ethylenimine, four aliphatic diamines, and two organic fluorine compounds. Results for ethylenimine include an experimental determination of its thermodynamic properties by means of low-temperature calorimetry, combustion calorimetry, and vapor

pressure measurements. The measured third-law entropy is discussed in light of a recent Russian value calculated from spectroscopic information. Work on the thermochemistry of aliphatic diamines includes purification of samples of 1,2-diaminoethane, 1,2-diaminopropane, 1,2-diaminobutane, and 1,2-diamino-2-methylpropane; heats of combustion of 1,2-diaminopropane and 1,2-diamino-2-methylpropane; and some low-temperature thermal measurements on 1,2-diaminopropane. P-V-T relations determined for hexafluoroethane include vapor pressures up to the critical state, critical constants, Pc, Tc, and Vc, and compressibility of the gas up to 350C and 400 atmospheres. Preliminary values for the vapor heat capacity of hexafluorobenzene are presented. (Author)
AD-653 986 HC$3.00 MF$0.65

THE ATOMIC ABSORPTION CROSS SECTIONS OF LITHIUM AND SODIUM BETWEEN 600 AND 1000 A,
Aerospace Corp El Segundo Calif Labs Div
Robert D. Hudson, and Virginia L. Carter. Jan 67, 22p Rept no. TR-1001 (9260-01)-5
SSD-TR-67-92
Contract AF 04 (695)-1001

Descriptors: (*Ultraviolet spectroscopy, Alkali metals), (*Atomic spectroscopy, Alkali metals), (*Lithium, Absorption spectrum), (*Sodium, Absorption spectrum), Continuous spectrum, Spectra (Visible + ultraviolet), Photons, Absorption, Probability, Vapors.

The continuous atomic absorption cross section of lithium and sodium vapors was measured between 600 and 1000 A using photoelectric techniques. Curves and tables are presented of the atomic absorption cross section versus energy from their series limits to 600 A. A comparison is made between these results and recent theoretical estimates. The conclusion is that theory and experiment are in reasonable agreement for lithium over the entire energy range, but that agreement for sodium is poor at photon energies above 7 eV. (Author)
AD-653 991 HC$3.00 MF$0.65

MICROWAVE PROPERTIES OF THIN FERRITE FILMS,
Polytechnic Inst of Brooklyn N Y Microwave Research Inst
L. M. Silber. 27 Feb 62, 8p Rept no. Memo-64, PIBMRI-997-62
Contracts AF 18 (600)-1505, DA-36-039-sc-78107

Descriptors: (*Films, Magnetic properties), Microwave frequency, Hall effect, Ferrites, Magnetite, Nickel compounds, Cobalt compounds, Magnesium compounds, Manganese compounds, Magnetic resonance.

The magnetic properties of thin ferrite films were investigated both by conventional microwave methods, and by observation of the dc 'Hall effect' voltage which is associated with ferromagnetic resonance. These measurements allow determination of the saturation magnetization, resonance linewidth or relaxation time, gyromagnetic ratio, extraordinary Hall coefficient, and magnetoresistance anisotropy. While the 'Hall effect' measurement can be made on films too thin to measure by conventional microwave techniques, the 'Hall' voltage is proportional to the microwave current density, and thus is largest in films of high conductivity. It has been possible thus far to study ferromagnetic resonance by the dc signal only in magnetite, while films of magnetite and nickel, magnesium, manganese, copper ferrites, mixed ferrites, and ferri-aluminates were studied by conventional microwave methods. The measurements reveal that the best films have magnetizations, gyromagnetic ratios, and linewidths which are quite comparable to those of the corresponding bulk ferrites. Films which are not prepared properly show deviations from bulk properties such as reduction of saturation magnetization and greatly increased linewidth. Possible explanations, such as strain and exchange anisotropy, are discussed. (Author)
AD-653 998 HC$3.00 MF$0.65

SPECTROSCOPIC RESEARCH.
Final rept., 15 Jan 63-31 Mar 67,
Chicago Univ Ill
Robert S. Mulliken. 31 May 67, 10p
AFCRL-67-0288
Contract AF 19 (628)-2474

Descriptors: (*Upper atmosphere, Spectroscopy), (*Ultraviolet spectroscopy, Molecular properties), (*Nitrogen, Band spectrum), (*Helium, Band spectrum), (*Chlorine, Emissivity), Molecular energy levels, Dissociation, Hydrides, Excitation, Absorption spectrum, Continuous spectrum, Isotopes.

Progress was made in the interpretation of the N2 bands, including a discussion of predissociations in the C (3)Pi-u state, and the relation of this state to the upper state of the Goldstein-Kaplan bands. A thorough study of the He2 molecule was carried through. Many new vibrational levels in known electronic levels, and many new electronic levels were discovered, including a number of higher members of Rydberg series. Further information was obtained on the behavior of the spectrum and structure of the third group hydrides. The emission spectrum of Cl2 (+) was reinvestigated under high resolution. In spite of an unprecented exhaustive experimental study (using Cl isotopes) to examine all possible details, the spectrum still presents some puzzling features which are not yet fully understood theoretically. (Author)
AD-654 005 HC$3.00 MF$0.65

A TECHNIQUE FOR SOLVING THE GENERAL REACTION-RATE EQUATIONS IN THE ATMOSPHERE.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 4A.
AD-654 010 HC$3.00 MF$0.65

DETERMINATION OF ELECTRONIC SYMMETRY BY ELECTRIC DEFLECTION: LiO AND LaO,
Little (Arthur D) Inc Cambridge Mass
Robert A. Berg, Lennard Wharton, William Klemperer, Alfred Buchler, and James L. Stauffer. 9 Jun 65, 8p
AROD-006:19
Contract DA-31-124-ARO (D)-315
Prepared in cooperation with Harvard Univ., Cambridge, Mass., Dept. of Chemistry.
Availability: Published in The Journal of Chemical Physics v43 n7 p2416-21 Oct 1 1965.

Descriptors: (*Molecular beams, Deflection), (*Lithium compounds, Electric moments), (*Lanthanum compounds, Electric moments), (*Molecular energy levels, Oxides), Electrostatics, Focusing, Dipole moments, Stark effect, Molecular orbitals, Ground state, Spectroscopy, Free radicals.
Identifiers: Lanthanum monoxide, Lithium monoxide.

The focusing, by means of an electrostatic quadrupole, of polar molecules with first- or second-order Stark effects is discussed. Indications of molecular electronic symmetry may be obtained from quantitative measurements of the intensity of refocusing of beams of diatomic molecules. Such measurements indicate that the ground state of LiO is pi while that of LaO is sigma. It is suggested that the optical spectroscopic data of ScO, YO, and LaO are best explained by assigning the ground states of these three molecules as (2)sigma. The observed low-lying electronic states of these molecules are interpreted in terms of a localized-orbital picture. (Author)
AD-654 016 Not available from CFSTI.

ELECTRIC-DEFLECTION STUDIES OF THE GEOMETRY OF SOME MOLECULES CONTAINING CESIUM,
Little (Arthur D) Inc Cambridge Mass
Alfred Buchler, and James L. Stauffer. 18 Jul 66, 7p
AROD-006:22
Contract DA-31-124-ARO (D)-315
Prepared in cooperation with Harvard Univ., Cambridge, Mass., Dept. of Chemistry.
Availability: Published in The Journal of Chemical Physics v46 n2 p605-8 Jan 15 1967.

Descriptors: (*Molecular beams, Deflection), (*Cesium compounds, Electric moments), Electrostatics, Oxides, Sulfates, Hydroxides, Sulfuric acid, Molecular structure, Thermodynamics.
Identifiers: Cesium hydroxide, Cesium oxides, Cesium sulfates.

The deflection of molecular beams in an inhomogeneous electric field shows that the species Cs2O is polar and therefore nonlinear. The species Cs2SO4, Cs2O2, and Cs2 (OH)2 are found to be nonpolar. H2SO4 is polar in agreement with the C2v heavy-atom structure deduced previously by Stafford and Chackalackal from infrared spectroscopy. (Author)
AD-654 017 Not available from CFSTI.

GASEOUS ALKALI-NITROGEN-OXYGEN AND ALKALI-PHOSPHORUS-OXYGEN COMPOUNDS,
Little (Arthur D) Inc Cambridge Mass
Alfred Buchler, and James L. Stauffer. 29 Jul 66, 6p
AROD-006:21
Contracts DA-31-124-ARO (D)-315, DA-19-020-ORD-558
Research supported in part by ARPA.
Availability: Published in The Journal of Physical Chemistry v70 n12 p4092-4 Dec 1966.

Descriptors: (*Lithium compounds, Vapors), (*Sodium compounds, Vapors), (*Nitrates, Mass spectrum), (*Nitrites, Mass spectrum), (*Phosphates, Mass spectrum), Alkali metal compounds, Polymers, Chemical equilibrium, Heat of reaction.
Identifiers: Lithium nitrate, Lithium nitrite, Lithium phosphate, Sodium nitrate, Sodium nitrite.

A mass-spectrometric examination of lithium and sodium nitrate and nitrite vapors was undertaken to find whether polymers are present in these systems. The mass spectrum of the vapor in equilibrium with lithium phosphate was also examined. (Author)
AD-654 018 Not available from CFSTI.

INFRARED SPECTRA OF LITHIUM MONOMERS,
Little (Arthur D) Inc Cambridge Mass
Alfred G. Emslie, Willima Klemperer, and Alfred Buchler. 23 May 60, 10p
AROD-006.16
Contract DA-31-124-ARO (D)-315
Prepared in cooperation with Harvard Univ., Cambridge, Mass. Dept. of Chemistry. Research supported in part by NSF and ARPA.
Availability: Published in Journal of Chemical Physics v33 n5 p1534-1540 Nov 1960.

Descriptors: (*Lithium compounds, *Infrared spectroscopy), Halides, Chlorides, Bromides, Iodides, Electric moments, Polarization, Electrostatics.
Identifiers: Lithium bromide, Lithium chloride, Lithium iodide.

The infrared spectra of the lithium halides were reexamined. The ionic-model treatment of the lithium halides was extended to take account of the higher multipole polarizabilities of the halide ions. The introduction of quadrupole and higher polarizabilities destroys the agreement between ob-

served and calculated spectroscopic constants which is found when only dipole polarizabilities are used. (Author)
AD-654 020 Not available from CFSTI.

INFRARED SPECTRA OF THE GROUP II HALIDES: ZINC HALIDES AND THE IONIC MODEL,
Little (Arthur D) Inc Cambridge Mass
Alfred G. Emslie, Alfred Buchler, and William Klemperer. 7 Sep 61, 13p
AROD-006.17
Contract DA-31-124-ARO (D)-315
Prepared in cooperation with Harvard Univ., Cambridge, Mass. Dept. of Chemistry. Research supported in part by ARPA and NSF.
Availability: Published in Journal of Chemical Physics v36 n9 p2499-2508 May 1 1962.

Descriptors: (*Infrared spectroscopy, Halides), (*Zinc compounds, Spectra (Infrared)), Chlorides, Bromides, Vapors, Ions, Polarization, Electric moments, Chemical bonds.
Identifiers: Zinc bromide, Zinc chloride.

The bending vibrations of gaseous ZnCl2 and ZnBr2 were observed in the cesium iodide region at 295 and 225/cm, respectively. It is shown that a molecular model based on polarizable ions cannot account for the observed bending frequencies of the Group II dihalides. (Author)
AD-654 022 Not available from CFSTI.

STUDY OF ACID ADSORPTION AND HYDROLYSIS OF CELLULOSE NITRATE AND CELLULOSE SULPHATE.
Progress rept. no. 2.
Picatinny Arsenal Dover N J
12 Jan 32, 33p Rept no. PA-TR-174

Descriptors: (*Nitrocellulose, Adsorption), Acids, Bases (Chemistry), pH, Colloids, Nitric acid, Sulfuric acid, Chemical analysis.

The report gives the results of determinations of the adsorptive power of nitrocellulose for acids and alkali and the development of a method of determining with accuracy the acidity of an aqueous solution containing nitrocellulose or its solid degradation products in colloidal solution. (Author)
AD-654 029 HC$3.00 MF$0.65

CRYSTALLITE SIZE DISTRIBUTIONS FROM X-RAY POWDER LINE PROFILES.
Technical rept.,
Georgia Inst of Tech Atlanta Engineering Experiment Station
Vedene H. Smith, Jr., and Paul G. Simpson. 25 Jan 65, 7p Rept no. TR-3
Contract Nonr-991 (09)
Revision of manuscript submitted 11 Aug 64. Prepared in cooperation with Uppsala Univ. (Sweden), Quantum Chemistry group.
Availability: Published in Journal of Applied Physics v30 n10 p3285-7 Oct 1965.

Descriptors: (*X-ray diffraction analysis, *Distribution functions), Crystal structure, Particle size, Measurement, X rays, Equations, Diffraction, X-ray diffraction cameras, Time.

Crystallite size distributions obtained from x-ray powder line profiles generally are approximated as a function of a continuous variable instead of a discrete variable. It is shown how this approximation can be removed from Warren and Averbach's treatment and that the same essential results are obtained. It is also shown that the technique of Warren and Averbach is valid for either narrow or broad diffraction lines if the crystallite size distribution is treated as a function of a discrete variable. (Author)
AD-654 051 Not available from CFSTI.

MINIMIZATION OF THE VARIANCE OF PARAMETERS DERIVED FROM X-RAY POWDER DIFFRACTOMETER LINE PROFILES.
Technical rept.,
Georgia Inst of Tech Atlanta Engineering Experiment Station
A. J. C. Wilson, John S. Thomsen, and F. Y. Yap. 9 Jul 65, 7p Rept no. TR-2
Contract Nonr-991 (09)
Prepared in cooperation with Johns Hopkins Univ., Baltimore, Md.
Availability: Published in Applied Physics Letters v7 n6 p163-5 Sep 15 1965.

Descriptors: (*X-ray diffraction analysis, *Mathematical analysis), X-ray diffraction cameras, Analysis of variance, Diffraction, Crystal structure, Particle size, Measurement, Time, Count-rate meters, Equations.

The length of time spent on collecting each data point of x-ray powder diffractometer line profiles has been considered in order to minimize the variance of any derived parameter, F. Preliminary or immediately preceding measurements of the number of counts per second at a data point could be used to determine the minimum time or counts in which F could be measured at a maximum acceptable variance. (Author)
AD-654 053 Not available from CFSTI.

THE DETERMINATION OF THE GEOMETRY OF HIGH-TEMPERATURE SPECIES BY ELECTRIC DEFLECTION AND MASS SPECTROMETRIC DETECTION,
Little (Arthur D) Inc Cambridge Mass
Alfred Buchler, James L. Stauffer, and William Klemperer. 27 Jun 64, 10p
AROD-006:11
Contract DA-19-020-ORD-5584, ARPA Order-4062
Availability: Published in Journal of the American Chemical Society v86 p4544-50 Nov 5 1964.

Descriptors: (*Molecular beams, Deflection), (*Electric moments, Measurement), Lithium compounds, Oxides, Beryllium compounds, Magnesium compounds, Transition elements, Lead compounds, Vapors, Dipole moments, Molecular structure.

The electric deflection of mass spectrometrically detected molecular beams was used to study the molecular geometry of high temperature species by determining whether they possess permanent dipole moments or not. By this means it was shown that (1) the lithium halide dimers are planar; (2) lithium oxide, Li2O, is linear; (3) the beryllium and magnesium dihalides are linear; the barium dihalides are bent; (4) the group IIB dihalides are linear; (5) the dihalides of the transition metals from manganese through copper are linear; (6) the lead dihalides are bent. Both PbI and PbI2 were found in lead iodide vapor. Many of the structural results are in disagreement with the prediction of simple theories of molecular geometry. (Author)
AD-654 058 Not available from CFSTI.

THERMODYNAMICS OF VAPORIZATION IN THE ALUMINUM OXIDE-BORON OXIDE SYSTEM,
Little (Arthur D) Inc Cambridge Mass
Paul E. Blackburn, Alfred Buchler, and James L. Stauffer. 2 Aug 65, 9p
AROD-006:20
Contracts DA-31-124-ARO (D)-315, AF 49 (638)-1171
Research supported in part by ARPA, order-315-62.
Availability: Published in Journal of Physical Chemistry v70 n8 p2469-74 Aug 1966.

Descriptors: (*Alumina, Vaporization), (*Boron compounds, Vaporization), Aluminum compounds, Oxides, Vapors, Thermodynamics, Mass spectrum, Heat of formation, Entropy, Borates, Vapor pressure.
Identifiers: Boron oxide.

The vaporization in the aluminum-boron-oxygen system was studied by means of Knudsen effusion weight loss and mass spectrometry. Over the binary Al2O3-B2O3 system, B2O3 was the only vapor species found. Heats and entropies of formation of the mixed oxides Al4B2O9 (c) and Al18B4O33 (c) were determined. Under reducing conditions in a system containing excess aluminum, gaseous aluminum monometaborate AlBO2 (g), aluminum boron suboxide AlBO (g), and boron monoxide BO (g), were identified. (Author)
AD-654 059 Not available from CFSTI.

GALVANOSTALAMETRY: A TECHNIQUE FOR CHEMICAL ANALYSIS.
Revised ed.,
National Bureau of Standards Washington D C
John L. Sligh, and Abner Brenner. 16 Jan 67, 6p
Revision of manuscript submitted 29 Sep 66.
Availability: Published in Journal of the Electrochemical Society v114 n5 p461-5 May 1967.

Descriptors: (*Chemical analysis, *Electrochemistry), Oxidation-reduction reactions, Electrolytic cells, Electrolysis, Gas discharges, Ions, Concentration (Chemistry).
Identifiers: Galvanostalametry.

A method utilizing a novel technique to designate the end-point of a diffusion controlled electro-reducible or -oxidizable reaction has shown promising analytical capability. The apparatus consists of a J-shaped, evacuated glass tube in which a column of electrolyte is suspended under tensile stress in the longer limb. One electrode is sealed into the top of the J and the other into the short limb. The formation of a minute amount of gas at the upper electrode by electrolytic discharge of hydrogen or oxygen causes the column of electrolyte to suddenly drop. It has been found that, in the constant-current electrolysis of a suitable supporting electrolyte containing an electroreactive ion, the transition time required for the column to drop is a function of the concentration of the ion. The use of this method is an analytical tool and its relationship to chronopotentiometry are discussed. (Author)
AD-654 100 Not available from CFSTI.

X-RAY STRESS ANALYSIS OF THE BAUSCHINGER EFFECT IN METALS.
Technical rept.,
Picatinny Arsenal Dover N J Ammunition Engineering Directorate
Donald L. Bagnoli, and Jacob J. Klappholz. Apr 67, 46p
PA-TR-3564

Descriptors: (*X-ray diffraction analysis, *Metals), Tensile properties, Stresses, Measurement, Loading (Mechanics), Projectiles, Computer programs, Intensity, Geometry, Compressive properties, Heat, Tests, Reflection, Tables.

As a result of tensile tests performed on fired 175mm shell bodies, it was observed that the yield point was lower after loading the shell in set-back. A sizeable difference in yield strength was measured between as-fired and unfired shells with little difference in ultimate tensile strength. One possible cause of this phenomenon is the Bauschinger Effect. The Bauschinger Effect states that a specimen which is plastically strained in one direction and along one axis has a greater yield strength for that direction, but reduced loading strength in the opposite direction. To prove the magnitude to which this material would undergo a reduction in yield, X-ray diffraction measurements were made of beams cut from specimen shell bodies. X-ray stress measurements were made while the beam was maintained under different loads. A computer

program was developed to calculate residual stress. (Author)
AD-654 142 HC$3.00 MF$0.65

AN ELECTROCHEMICAL CARBON DIOXIDE REDUCTION - OXYGEN GENERATION SYSTEM HAVING ONLY LIQUID WASTE PRODUCTS.
Phase I of Final rept., Apr 66-Feb 67,
Ionics Inc Watertown Mass
Frank B. Leitz. Feb 67, 37p
Contract N00014-66-C-0139

Descriptors: (*Electrochemistry, *Carbon dioxide), Oxygen, Waste gases, Efficiency, Hydrogen, Submarines, Formic acids, Methanols, Detection, Catalysts, Hazards, Electrodes, Disposal, Electric currents, Operation, Liquids, Exhaust gases, Compressive properties, Ejection.

The electrochemical reduction of carbon dioxide has been investigated as a means of simplifying the disposal of carbon dioxide and hydrogen from a submarine atmospheric regeneration unit. Ejection of these materials as gases requires compression and produces a visible exhaust both of which are detection hazards. If these two gas streams could be chemically combined into simple liquid organic compounds, both hazards would be effectively eliminated. Catalytic combination has not proven feasible because of the temperatures and pressures involved. Electrochemical combination of these materials presented a desirable alternative. The investigation which comprises phase 1 of the overall problem, was undertaken to determine the chemical feasibility of the concept. The major task was selection of appropriate electrodes and operating conditions to carry out the desired electrochemical reactions. Conceptually, the cell consists of an anode at which water is electrolyzed to oxygen, a cathode at which carbon dioxide is reduced, and an electrolyte path between the two. A study of the effect of electrode potential revealed that formic acid could be reduced to methanol at a smooth tin catalyst with 100% current efficiency. The experimental work was sufficiently successful that a working unit, albeit inefficient, could be built with the present technology. However, it will be the purpose of phase 2 of this program to establish the engineering feasibility of this concept. (Author)
AD-654 146 HC$3.00 MF$0.65

FURTHER TESTS OF DILUTE SOLUTION EQUATIONS AND THERMODYNAMIC RELATIONSHIPS.,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 7B.
For abstract, see NSA 21 13.
LA-3657 HC$3.00 MF$0.65

STUDIES ON KINETICS AND THE MECHANISM OF THE OXIDATION OF HYDROCARBONS IN THE GAS PHASE. PART IV. A GAS CHROMATOGRAPHIC METHOD FOR THE ANALYSIS OF THE INTERMEDIATE OXIDATION PRODUCTS OF N-HEPTANE.
Studium Der Kinetik Und Mechanismus Der Oxydation Von Benzinkohlenwasserstoffen in Der Gasphase. Iv. Mitteilung. Eine Gaschromatographische Methode Zur Analyse Der Oxydationszwischenprodukte des N-heptans
Royal Aircraft Establishment, Farnborough (England).
E. Leibnitz, G. Ohlmann, and E. Schroder. Dec 66, 12p RAE-LIB-TRANS-1203
Transl. Into English From Z. Physik. Chem. (Frankfurt), No. 225, 1964 P 168-174

Descriptors: *Gas chromatography, *Heptane, *Oxidation, Apparatus, Chemistry, Chromatography, Column, Gas, Hydrocarbon, Phase, Product, Reaction, Separation.

For abstract, see STAR 05 15.
N67-27797 HC$3.00 MF$0.65

MAGNETIC RESONANCE IN HYDROGEN-BONDED FERROELECTRICS.
Nuklearni Institut Jozef Stefan, Ljubljana (Yugoslavia).
R. Blinc. Dec 66, 82p NIJS-R-493
Submitted for Publication

Descriptors: *Ferroelectrics, *Hydrogen bond, *Magnetic resonance, Ammonium, Bond, Deuteron, Electron, Hydrogen, Lattice, Magnetic, Nuclear, Proton, Relaxation, Resonance, Salt, Spectrum, Spin, Transition.

For abstract, see STAR 05 15.
N67-27873 HC$3.00 MF$0.65

ELECTROCHEMICAL STUDIES IN NON-AQUEOUS SOLVENTS. I - ACETONITRILE.
Carnegie Inst. of Tech., Pittsburgh, Pa. Dept. of Chemistry.
L. M. Gedansky, and K. S. Pribadi. 1966, 28p
NASA-CR-84657
NASA ORDER R-09-022-029

Descriptors: *Acetonitrile, *Electrochemistry, *Solvent, Activity, Aqueous, Cell, Coefficient, Constant, Electrolyte, Ionization, Measurement, Physical, Polarography, Property, Solubility.

For abstract, see STAR 05 15.
N67-28011 HC$3.00 MF$0.65

PHOTOGRAPHIC STUDY OF CONDENSING MERCURY FLOW IN 0- G AND 1- G ENVIRONMENTS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
H. B. Block, C. C. Crabs, R. P. Macosko, and D. Namkoong. Jun 67, 17p NASA-TN-D-4023
Contract 120-33-07-03-22
Film Supplement C-251 and Lewis Motion Picture C-221 To This Report Are Available on Loan From Lewis Res. Center, Cleveland, Ohio

Descriptors: *Condensation, *Gravity, *Mercury vapor, *Motion picture, Concentration, Facility, Flow, Glass, High speed, Length, Mercury, Photography, Rate, Test, Tube, Vapor, Zero.

For abstract, see STAR 05 15.
N67-28739 HC$3.00 MF$0.65

THE NON-NEUTRAL IONIZED CHEMICAL EQUILIBRIUM SUBROUTINE.
Aerotherm Corp., Palo Alto, Calif.
R. M. Kendall. 4 May 67, 18p NASA-CR-73091, REPT.-67-13
Contract NAS2-3929

Descriptors: *Chemical equilibrium, *Computer program, *Shock layer, *Subroutine, Chemical, Computer, Equilibrium, Input, Ionized, Layer, Operation, Output, Program, Property, Shock, Solution, System, Thermodynamic, Transport, Viscous.

For abstract, see STAR 05 15.
N67-28752 HC$3.00 MF$0.65

RESISTANCE OF POLYMERIC MATERIALS TO NITROGEN TETROXIDE.
IIT Research Inst., Chicago, Ill. Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A. M. Stake. 5 Mar 67, 30p NASA-CR-84844, IITRI-U6046-7
Contract NAS7-100
Prepared for Jpl

Descriptors: *Elastomer, *Nitrogen, *Polymer chemistry, *Tetroxide, Attack, Cause, Chain, Chemistry, Cross, Elongation, Linking, Material, Mechanism, Polymer, Resistance, Scission.

For abstract, see STAR 05 15.
N67-28828 HC$3.00 MF$0.65

7E. RADIO AND RADIATION CHEMISTRY

A MOSSBAUER STUDY OF IRON (II)-1,10-PHENANTHROLINE COMPLEXES.
Victoria Univ Wellington (New Zealand) Dept of Chemistry
J. F. Duncan, and K. F. Mok. 28 Mar 66, 7p
AFOSR-67-1297
Grant AF-AFOSR-27-65
Availability: Published in Journal of the Chemical Society (A) Inorganic, Physical, and Theoretical Chemistry p1493-6 1966.

Descriptors: (*Complex compounds, *Mossbauer effect), (*Iron compounds, Mossbauer effect), N-heterocyclic compounds, Synthesis (Chemistry), Nuclear spectroscopy, Infrared spectroscopy, Spectra (Visible + ultraviolet), Molecular isomerism, Molecular association, Interactions, New Zealand.
Identifiers: Iron phenanthrolines, Mossbauer spectroscopy.

Compounds of the type Fe phen2X2 and (Fe phen3)X2 were made and studied by Mossbauer spectroscopy supplemented by infrared spectroscopy and reflectance spectra in the visible region. The results are in accordance with a cis structure for the bisphenanthroline compounds. The interaction: between the phenanthroline molecules, the anionic ligands, and the iron atoms are discussed. (Author)
AD-653 435 Not available from CFSTI.

STANDARDIZATION OF BETA COUNTING PROCEDURES USED AT NRL IN THE RADIOCHEMICAL ANALYSIS OF AIR FILTER SAMPLES.
Naval Research Lab Washington D C
For primary bibliographic entry see Field 18D.
AD-653 448 HC$3.00 MF$0.65

PHOTOCURRENTS AT A METAL-ELECTROLYTE INTERFACE.
Technical rept.,
New York Univ N Y Dept of Chemistry
V. P. Sharma, P. Delahay, G. G. Susbielles, and G. Tessari. Jun 67, 23p Rept no. TR-3
Contract Nonr-285 (65)
Availability: Published in Journal of Electroanalytical Chemistry and Interfacial Electrochemistry.

Descriptors: (*Electrolytic cells, *Photoelectric effect), Metals, Electrolytes, Interfaces, Electrodes, Mercury, Sodium compounds, Fluorides, Nitrogen oxides, Excitation, Field emission, Voltage, Photons, Perchloric acid.
Identifiers: Sodium fluoride.

Photocurrents were measured by means of a coulostatic method with a dropping mercury electrode (DME) for 0.1 M sodium fluoride saturated with nitrous oxide from 2506 to 3900A at 200A intervals. The DME was irradiated with a xenon flash tube (325 joules per flash) fitted with third-order interference filters having a half-intensity band width of approximately 80A. Irradiation intensities were standardized, and results are reported for the same flux of photons at each wavelength. Plots of the square root of the photocurrent against potential were essentially linear and parallel at each wavelength. The possibility of exponential dependence of the photocurrent on potential and frequency was also examined. A similar study was carried out for 0.1 M solution of the sodium halides saturated with nitrous oxide. Fowler's treat-

ment of the field effect on photoemission by a metal in vacuum is transposed to the metal-electrolyte interface, and theoretical and experimental results are compared. (Author)
AD-653 453 Not available from CFSTI.

ATOM RECOMBINATION PART I. HALOGEN ATOMS; PART II. SINGLET MOLECULAR OXYGEN.
British Columbia Univ Vancouver Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-653 611 HC$3.00 MF$0.65

NO-O CHEMILUMINESCENCE STUDIES FLIGHT AND WIND TUNNEL EXPERIMENTS.
Mithras Inc Cambridge Mass
For primary bibliographic entry see Field 4A.
AD-653 649 HC$3.00 MF$0.65

REACTIONS OF C3H6 (+) WITH C3 AND C4 PARAFFINS,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7D.
AD-653 705 Not available from CFSTI.

ON CHEMILUMINESCENT RADIATION FROM NITROGEN DIOXIDE DURING PCA EVENTS,
California Univ Berkeley Dept of Physics
For primary bibliographic entry see Field 4A.
AD-653 811 Not available from CFSTI.

A TECHNIQUE FOR SOLVING THE GENERAL REACTION-RATE EQUATIONS IN THE ATMOSPHERE.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 4A.
AD-654 010 HC$3.00 MF$0.65

INFRARED SPECTRA OF THE GROUP II HALIDES: ZINC HALIDES AND THE IONIC MODEL,
Little (Arthur D) Inc Cambridge Mass
For primary bibliographic entry see Field 7D.
AD-654 022 Not available from CFSTI.

MOSSBAUER SPECTRA AND EFFECTIVE FIELD PARAMETERS IN IRON COMPOUNDS,
Boston Univ Mass Dept of Physics
Gilbert R. Hoy, and Subhas Chandra. Mar 67, 215p
AROD-6338:5-P
Grant DA-ARO (D)-31-124-G808

Descriptors: (*Iron compounds, *Mossbauer effect), (*Nuclear spectroscopy, Iron compounds), Quadrupole moments, Hyperfine structure, Line spectrum, Nuclear energy levels, Gamma emission, Electric fields, Tables.

Mossbauer spectra were computed for the situation in which both static quadrupole and hyperfine interactions are present. The explicit calculations are restricted to the case when either the source or absorber is a 'single line' and the nuclear levels are the same as in the 57Fe 14.4 keV transition. Furthermore, the calculations apply only to powder samples. Cases are included in which the asymmetry parameter of the electric field gradient tensor (EFG) is non-zero and various possible directions of the internal effective magnetic field with respect to the EFG principal axes are allowed. The purpose of the report is to provide the means by which experimentalists, doing Mossbauer spectroscopy in ferrous compounds below their transition temperatures, can estimate the effective field parameters in their specimen. To that end a graphical representation is included as well as the explicit values for peak positions and intensities assuming various values of the effective field parameters. (Author)
AD-654 044 HC$3.00 MF$0.65

ANNUAL REPORT FOR 1965 IN THE PHYSICAL SCIENCES. VOLUME 2. RADIOLOGICAL SCIENCES,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
D. W. Pearce, and J. K. Green. May 66, 178p
Contract AT (45-1)-1830

Descriptors: (*Radiation chemistry, Scientific research), (*Radiation measurement systems, Reports), Environment, Medicine, Radiobiology, Whole body irradiation, Radiological dosage.

For abstract, see NSA 21 13.
BNWL-235-2 HC$3.00 MF$0.65

CHARACTERIZATION OF HIGH-BOILING PRODUCTS FROM IRRADIATED BIPHENYL AND TERPHENYLS,
Phillips Petroleum Co., Bartlesville, Okla. Research and Development Dept.
P. W. Solomon, P. S. Hudson, and A. J. Moffat.
30 Aug 63, 47p
Contract AT (10-1)-1080

Descriptors: (*Reactor moderators, *Reactor coolants), Boiling, Pyrolysis, Boilers, Oxidation, Chlorine, Benzene, Distillation, Molecular weight, Heating, Chemical reactions, Hydrogenation, Carbon black, Storage, Reactor cores, Pheny ethers.

For abstract, see NSA 21 13.
IDO-16909 HC$3.00 MF$0.65

KILOVOLT EUROPIUM CAPTURE CROSS SECTIONS,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 13.
LA-3643 HC$3.00 MF$0.65

DEVELOPMENT OF A RADIOACTIVE PEBBLE BED CHEMICAL REACTOR SYSTEM.
Western New York Nuclear Research Center, Inc., Buffalo.
For primary bibliographic entry see Field 7C.
For abstract, see NSA 21 13.
NYO-3718-1 HC$3.00 MF$0.65

THE RADIOLYTIC AND PYROLYTIC DECOMPOSITION OF ORGANIC COOLANTS. III - THE RADIOLYSIS AND PYROLYSIS OF M-TERPHENYL AND M- TERPHENYL-D14.
European Atomic Energy Community, Ispra (Italy).
F. Dorpema, G. Juppe, and H. Rau. Mar 67, 37p
EUR-3172.E

Descriptors: *Organic coolant, *Pyrolysis, *Radiolysis, Aromatics, Benzene, Coolant, Decomposition, Dissociation, Formation, Gas, Hydrocarbon, Liquid, Organic, Product, Reaction, Terphenyl.

For abstract, see STAR 05 15.
N67-27875 HC$3.00 MF$0.65

INDEX TO NUCLEAR CHEMISTRY DIVISION ANNUAL REPORT, 1966.
California Univ., Berkeley. Lawrence Radiation Lab.
28 Mar 67, 42p
Contract W-7405-eng-48

Descriptors: (*Radiation chemistry, *Documentation), (*Radiochemistry, Indexes), (*Nuclear physics laboratories, Reports), Computer programs, Technical information centers.

For abstract, see NSA 21 13.
UCRL-17299-Supple HC$3.00 MF$0.65

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. BIOLOGICAL OCEANOGRAPHY

WINTER OBSERVATIONS ON SPECIES OF PORPHYRA FROM HALIFAX COUNTY, NOVA SCOTIA,
National Research Council of Canada Halifax (Nova Scotia) Atlantic Regional Lab
T. Edelstein, and J. McLachlan. 1965, 6p
NRC-8917
Availability: Published in Proceedings of the International Seaweed Symposium n5 p117-22 Aug 25-28 1965.

Descriptors: (*Algae, Periodic variations), (*Marine biology, Algae), Seacoast, Nova Scotia, Tides, Distribution.

The occurrence during the winter of Porphyra linearis Grev., P. umbilicalis L. and P. miniata (Lyngbye) C.Ag. on the Atlantic coast of Halifax County, Nova Scotia is described and compared with the occurrence elsewhere in the North Atlantic. Porphyra linearis was found only on exposed, rocky shores in the high-tide and spray zones, and completely disappeared by early spring. Several forms of P. umbilicalis, characteristic of tidal levels, were observed and agree with the forms previously described from Britain. Only small, juvenile plants of P. miniata were found in tide pools; this species did not persist in these pools and during the summer months was found only in the sublittoral. (Author)
AD-653 409 Not available from CFSTI.

OCEANIC RESEARCH PROGRESS REPORT, JULY 1965 TO JUNE 1966.
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8J.
AD-653 434 HC$3.00 MF$0.65

DISTRIBUTION OF n-PARAFFINS IN MARINE ORGANISMS AND SEDIMENT.
Technical rept.,
Woods Hole Oceanographic Institution Mass
R. C. Clark, Jr., and M. Blumer. Jun 67, 13p Rept no. WHOI-Ref-67-30, WHOI-Contrib-1830
Contract N00014-66-C-0241, Grant NSF-GP-3250
Availability: Published in Limnology and Oceanography v12 n1 p79-87 Jan 1967.

Descriptors: (*Algae, Hydrocarbons), (*Marine biology, Algae), Plankton, Seacoast, Alkanes, Chromatographic analysis.

Twelve species of benthic algae from the northeast coast of the United States, three species of planktonic algae grown in the laboratory, a pelagic alga, a sample of mixed phytoplankton and zooplankton, and a recent marine sediment were analyzed for their normal paraffin distribution from C14H30 to C32H66. Normal paraffins occurred in all samples. Benthic and planktonic algae and the mixed plankton sample exhibited only a slight odd-carbon predominance. All algae showed a major maximum at n-C15H32 or n-C17H36, a minimum between n-C18H38 and n-C21H44 and a secondary maximum between n-C27H56 and n-C30H62. In all these features, the algae and the plankton differed from recent marine sediments. This suggests that the normal paraffins of recent marine sediments are largely derived from sources other than the organisms studied. Differences in the hydrocarbon distribution patterns of various classes of benthic algae may be of taxonomic value. Pris-

tane occurs in several benthic and planktonic algae; phytane, if present, occurs at a concentration too low to be detected by the method used. (Author)
AD-653 479 Not available from CFSTI.

PRELIMINARY REPORT ON THE TEXAS A AND M EASTROPAC CRUISE, 21 JANUARY TO 10 APRIL 1967.
Texas A and M Univ College Station Dept of Oceanography
For primary bibliographic entry see Field 8J.
AD-653 737 HC$3.00 MF$0.65

OCEANOGRAPHIC RESEARCH.
Lamont Geological Observatory Palisades N Y
For primary bibliographic entry see Field 8J.
AD-653 878 HC$3.00 MF$0.65

COMPILATION OF REPRINTS.
Technical repts.
Oregon State Univ Corvallis Dept of Oceanography
Jun 67, 26p Rept no. TR-87-90
Contracts Nonr-1286 (09), Nonr-1286 (10)
Availability: Published in Various Journals.

Descriptors: (*Oceanographic data, *Scientific research), (*Oceanology, Reports), Carbonates, Oceans, Sampling, Ocean bottom sampling, Silicates, Gravity, Anomalies, Isostatic change, Measurement, Terrain, Buffers, Sedimentation, Foraminifera, Stratigraphy, Carbon dioxide, Sedimentary rock, Maps, Bathythermograph data.

Contents: Free-air gravity anomalies along the inside passage of British Columbia and Alaska; A multiple corer; Uplift of the continental margin and possible continental accretion off Oregon; Carbonate cycle and the buffer mechanism of recent oceans. (Author)
AD-654 138 Not available from CFSTI.

LIST OF FAUNA INHABITING THE SEA WATER OF SOUTHERN SAKHALIN AND THE SOUTHERN KURILE ISLANDS,
Naval Oceanographic Office Washington D C
G. U. Lindberg. 1967, 7p Rept no. NOO-Trans-312
TT-67-62165
Spisok Fauny Morskikh vod Yuzhnogo Sakhalina u Yuzhnykh Kurilskikh Ostrovov, trans. of Issledovaniya Fauny Morei (USSR), n6 p173-256 1959.

Descriptors: (*Marine biology, Pacific Ocean islands), Aquatic animals, Plankton, Seacoast, Distribution, Classification, USSR.

The species collected by the Kurile-Sakhalin expedition during 1947-1949 are listed in taxonomical order. Their distribution over seven areas in Southern Sakhalin and Kurile regions is also pointed out.
AD-654 148 HC$3.00 MF$0.65

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, 1965. VOLUME I. BROWN BEAR CRUISE 352: 11-28 JANUARY, BROWN BEAR CRUISE 357: 14-28 APRIL, BROWN BEAR CRUISE 368: 4-22 AUGUST, BROWN BEAR CRUISE 380: 3-18 NOVEMBER.
Technical rept.,
Washington Univ Seattle Dept of Oceanography
Richard H. Fleming, and Clifford A. Barnes. Feb 67, 3335p Rept no. TR-182, WU-Ref-M67-0
Contracts AT (45-1)-1725, Nonr-477 (37)

Descriptors: (*Oceanographic data, *Pacific Ocean), (*Oceanology, Reports), Periodic variations, Temperature, Salinity, Marine biology, Physical properties, Ocean bottom sampling, Samplers, Bathythermograph data, Sedimentation, Wind, Velocity, Carbon, Sea water, Carbonates, Depth indicators, Pressure, Rivers, Washington (State).

Volume I of this two-volume report contains tabulated physical, chemical, and biological data collected during cruises 352, 357, 368 and 380 of the Research Vessel Brown Bear during 1965 in an area within 650 nautical miles of the coasts of Washington and Oregon. These data were collected as part of a year-round study which has as its objectives the determination of the properties, distribution, and movement of the Columbia River effluent water in the Northeast Pacific. (Author)
AD-654 172 HC$3.00 MF$0.65

8B. CARTOGRAPHY

GEOGRAPHY AND THE PROPERTIES OF SURFACES. CONCEPTS AND APPLICATIONS-SPATIAL ORDER.
Harvard Univ Cambridge Mass Lab for Computer Graphics
For primary bibliographic entry see Field 8F.
AD-653 464 HC$3.00 MF$0.65

TEST OF QUANTITATIVE TERRAIN DESCRIPTION SYSTEMS AT FORT LEONARD WOOD, MISSOURI,
Missouri School of Mines and Metallurgy Rolla
James C. Maxwell. Jun 62, 107p
Contract DA-22-079-eng-303

Descriptors: (*Mapping, *Terrain), Environment, Maps, Missouri, Surfaces, Plants (Botany), Trees.

In June, 1961, the Civil Engineering and Geology Departments of the Missouri School of Mines and Metallurgy contracted with the U. S. Army Engineers Waterways Experiment Station to study and test the feasibility of three systems for describing and mapping components of the natural environment. The three systems were concerned with surface geometry, the configuration of topographic surface features of greater than ten feet vertical relief; microrelief, the configuration of topographic surface features of less than ten feet relief; and vegetation, its distribution and other characteristics. The systems were to be tested by applying them to the area of Fort Leonard Wood, Missouri, and its immediate environs. The test was to produce maps of the area, at scales of 1:25,000, 1:50,000 and 1:250,000, showing characteristics described by the systems. This report discusses the problems encountered, the steps taken to correct deficiencies, and the rationale used in the development of the corrective steps. In addition, this report contains a description of the maps and data compiled.
AD-653 631 HC$3.00 MF$0.65

8C. DYNAMIC OCEANOGRAPHY

ASPECTS OF A COMPUTATIONAL MODEL FOR LONG-PERIOD WATER-WAVE PROPAGATION,
Rand Corp Santa Monica Calif
Jan J. Leendertse. May 67, 178p Rept no. RM-5294-PR
Contract F44620-67-C-0045

Descriptors: (*Sea water, Water waves), (*Water waves, Propagation), (*Mathematical models, Hydrodynamics), Difference equations, Tides, Distribution functions, Equations of motion, Partial differential equations, Stability.

The model is based upon numerical integration of the hydrodynamic equations governing the long-period wave motions of the sea. The basis of computation is the vertically integrated equations of motion and continuity in an Eulerian system. The partial-differential equations, which include the effects of earth rotation and bottom roughness, are approximated by two sets of difference equations. The two sets are used in succession for a step-by-step solution in time. An analytical investigation of simplified sets of difference equations indicates that this multioperation method is unconditionally stable. The discreteness of the representation of the waves in time and in two spatial dimensions influences the computed velocity of wave propagation but not (or insignificantly, through terms of a second order of magnitude) the amplitude of the wave. The computational method, which is presented in FORTRAN, permits modeling of long waves, such as tides, surges, seiches, and tsunamis, in areas with complicated boundaries in an expedient manner and is particularly suited for hydraulic engineering research. A guide is given for use of the model, and computational effects are discussed in detail. The use of the computational procedure is illustrated with results of tidal computations of the southern North Sea and of the Haringvliet in the estuary of the Rhine River. (Author)
AD-653 515 HC$3.00 MF$0.65

VERTICAL AND HORIZONTAL THERMAL STRUCTURES IN THE SEA.
Navy Electronics Lab San Diego Calif
For primary bibliographic entry see Field 8J.
AD-653 739 HC$3.00 MF$0.65

TWO-DIMENSIONAL GRAVITY WAVES IN A STRATIFIED OCEAN,
California Inst of Tech Pasadena Div of Engineering and Applied Science
For primary bibliographic entry see Field 20D.
AD-654 122 Not available from CFSTI.

DYNAMICS OF THE ANTARCTIC CIRCUMPOLAR CURRENT (A.C.C.) PART I.
Technical rept.,
Lamont Geological Observatory, Palisades, N. Y.
Takashi Ichiye. Apr 67, 34p CU-1-67
Grant NSF-GA-258
See also Part 2, PB-174 941, and Part 3, PB-174 942.

Descriptors: (*Ocean currents, Antarctic regions), (*Dynamics, Ocean currents), Equations of motion, Wind, Equilibrium, Stresses, Intensity, Ocean bottom, Tables, Mathematical analysis, Salinity.

Equations of motion and continuity of the volume transport of the Antarctic Circumpolar Current (A.C.C.) are derived for the barotropic mode, including the advective terms, bottom friction and horizontal stress terms. In the zonal component of equations of motion averaged along the entire latitude circles, the Coriolis term, the zonal wind stress and the bottom friction are of the same order of magnitude, while the advective terms, the pressure gradient and the horizontal eddy viscosity terms are less by one to two orders of magnitudes than these terms. The meridional transport changes the zonal transport through the Coriolis effect in such balance of forces in the zonal direction. The northward transport of about 7 x 1,000 (sq cm/sec) which was postulated by Munk (1966) from conservation of salinity, carbon-14, oxygen and heat will decrease the eastward transport due to the zonal wind stress only almost to half. Without the effect of the meridional transport, the zonal transport due to the zonal wind stress becomes almost double the observed value. The horizontal eddy viscosity terms becomes important only near the north and south boundaries of the A.C.C. The effect of Drake Passage also is to decrease the zonal transport by increasing the average north-

ward transport as verified in the Antarctic model experiment with a rotating table. (Author)
PB-174 940 HC$3.00 MF$0.65

DYNAMICS OF THE ANTARCTIC CIRCUMPOLAR CURRENT (A.C.C.), PART II.
Technical rept.,
Lamont Geological Observatory, Palisades, N. Y.
Takashi Ichiye. Apr 67, 33p CU-2-67
Grant NSF-GA-258
See also Part 1, PB-174 940 and Part 3, PB-174 942.

Descriptors: (*Ocean currents, Antarctic regions), (*Dynamics, Ocean currents), Equations of motion, Wind, Equilibrium, Stresses, Intensity, Ocean bottom, Tables, Mathematical analysis, Viscosity.

Dimensionless forms of the linearized equations of motion are derived about the transports of the A.C.C. which is assumed to be barotropic. The scaling process indicates that the geostrophic equilibrium is predominant and that the zonal wind stress is balanced with the bottom friction and the Coriolis term. The horizontal eddy viscosity terms are less than these terms at least by one order of magnitude. The vorticity relation postulates that the streamlines be parallel to the isolines of f/H, where f is the Coriolis parameter and H is the depth. The magnitude of the quasi-zonal transport depends on the meridional transport as well as the zonal wind stress. The average meridional transport determined from the observed wind stress and zonal transport is northward and about 5 x 1,000 sq cm/sec, almost equaling the value estimated in the previous report. The rotating model experiments indicate that the effect of cooling along the periphery of the Antarctic continent generates eastward transport, in agreement with the theory. Also, the experiments show that the main features of the A.C.C. are maintained by the wind-driven current. (Author)
PB-174 941 HC$3.00 MF$0.65

DYNAMICS OF THE ANTARCTIC CIRCUMPOLAR CURRENT (A.C.C.), PART III.
Technical rept.,
Lamont Geological Observatory, Palisades, N. Y
T. Ichiye. Jun 67, 32p CU-3-67
Grant NSF-GA-258
See also Part 1, PB-174 940 and Part 2, PB-174 941.

Descriptors: (*Ocean currents, *Antarctic regions), (*Dynamics, Ocean currents), Ocean bottom topography, Intensity, Wind, Equations of motion, Stresses, Viscosity, Ocean bottom, Tables, Mathematical analysis.

A dismensional analysis is applied to the circulation around Drake Passage. It indicates presence of the frictional boundary layer (due to horizontal eddy viscosity) with a width of the order of 10 km off the meridional coasts, in contrast with the frictional and inertia boundary layer with a width of the order of 100 km in the mid-latitude ocean. The western boundary current off the east coast of South America flows northward and southward respectively in the southern and northern part and has a width of about 300 km. The inertia terms tend to increase the widths of both the western boundary layer and the current there. The boundary current off the west coast of South America is broad and ill-defined and its intensity and direction is governed by the wind stress distribution there as well as the bottom topography and the coastline orientation. The southern boundary layer off the Antarctic Continent in general is much broader than off the meridional coasts and has a width of the order of 600 km but in some locations like Weddel Sea and Ross Sea there are jet-like eastward currents due to a leeward eddy effect of the coastline, forming counter currents there. (Author)
PB-174 942 HC$3.00 MF$0.65

8D. GEOCHEMISTRY

OCEANIC RESEARCH PROGRESS REPORT, JULY 1965 TO JUNE 1966.
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8J.
AD-653 434 HC$3.00 MF$0.65

PRELIMINARY REPORT ON THE TEXAS A AND M EASTROPAC CRUISE, 21 JANUARY TO 10 APRIL 1967.
Texas A and M Univ College Station Dept of Oceanography
For primary bibliographic entry see Field 8J.
AD-653 737 HC$3.00 MF$0.65

COMPILATION OF REPRINTS.
Oregon State Univ Corvallis Dept of Oceanography
For primary bibliographic entry see Field 8A.
AD-654 138 Not available from CFSTI.

8E. GEODESY

GEODETIC CONTROL WITHOUT TRIANGULATION, TRILATERATION, OR GRAVITY DATA AND GRAVIMETRIC REDUCTION OF LEVELLING.
Interim technical rept. no. 4, Aug 65-Feb 66,
Ohio State Univ Columbus Dept of Geodetic Science
Ivan I. Mueller, Edward J. Krakiwsky, and Hans D. Preuss. Mar 66, 12p
Contract DA-44-009-AMC-507 (X)

Descriptors: (*Geodesics, Reports), Gravity, Control, Triangulation, Balances, Astronomical geodesics, Computer programs, Tables, Measurement, Terrain, Mathematical analysis.

The report shows the progress made during the months of August 1965 through February 1966, on Tasks No. 1 and No. 2 of the contract. The work on Task No. 1 is progressing satisfactorily. Local tests on the newly arrived torsion balance are in progress. Preparations are being made for the summer field work. The work on Task No. 2 is practically finished. The last part of the final report on this item is being prepared, and will be submitted about June 1, 1966. (Author)
AD-653 775 HC$3.00 MF$0.65

GEODETIC CONTROL WITHOUT TRIANGULATION, TRILATERATION, OR GRAVITY DATA AND GRAVIMETRIC REDUCTION OF LEVELLING.
Interim technical rept. no. 5, Mar-Aug 66,
Ohio State Univ Columbus Dept of Geodetic Science
Ivan I. Mueller, and John Badekas. Sep 66, 9p
Contract DA-44-009-AMC-507 (X)

Descriptors: (*Geodesics, Reports), Gravity, Balances, Measurement, Accuracy, Maps, Astronomical data, Periodic variations.

The report presents programs in accomplishing the following: To develop a method that establishes geodetic control within a limited area from astronomic observations by removing the deflections of the vertical directly obtained from torsion balance measurements at the station; and to develop a reduction method best suited for the United States which would substitute the presently used method based on the normal gravity field.
AD-653 776 HC$3.00 MF$0.65

GEODETIC CONTROL WITHOUT TRIANGULATION, TRILATERATION, OR GRAVITY DATA AND GRAVIMETRIC REDUCTION OF LEVELLING.
Interim technical rept. no. 6, Sep 66-Feb 67,
Ohio State Univ Columbus Dept of Geodetic Science
John Badekas, and Ivan Mueller. Mar 67, 9p
Contract DA-44-009-AMC-507 (X)

Descriptors: (*Geodesics, Reports), Gravity, Astronomy, Terrain, Computer programs, Measurement, Gravimetric analysis, Tables, Maps, Astronomical data, Tests.

The report shows the progress made during the months of September 1966 through February 1967, on Task No. 1 of the contract. The work on Task No. 1 is progressing satisfactorily. The field work was carried out and the computation process has been started. (Author)
AD-653 777 HC$3.00 MF$0.65

PROPOSED ESTABLISHMENT OF A FIRST-ORDER HEIGHT SYSTEM IN THE U.S.A.
Final rept. Jul 65-Feb 66,
Ohio State Univ Columbus Dept of Geodetic Science
Edward J. Krakiwaky, and Ivan I. Mueller. Sep 66, 86p Rept no. 72
Contract DA-44-009-AMC-507 (X)
Supplement to interim rept. no. 5.

Descriptors: (*Geodesics, Reports), Gravity, Height finding, Least squares method, Measurement, Theory, Maps, Tables, Errors, Mathematical analysis, Mapping.

The various types of heights and their numerous methods of computation are presented along with a summary and discussion. Based on theoretical and practical considerations, conclusions are drawn as to which height (along with its corresponding method of computation) is best suited for a specific purpose. (Author)
AD-653 778 HC$3.00 MF$0.65

ON THE THEORY OF DETERMINING THE TOPOGRAPHIC SURFACE OF THE EARTH. PART II,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
I. F. Monin. May 67, 16p Rept no. ACIC-TC-1172
TT-67-62145
K Teorii Opredeleniya Topograficheskoi Poverkhnosti Zemli. Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Geodeziya i Aerofotosemka (USSR) n6 p71-6 1965.

Descriptors: (*Terrain, *Geodesics), (*Topology, Surfaces), Ellipsoids, Density, Integral equations, Earth (Planet), Gravity, Anomalies, Transformations (Mathematics), Azimuth.

Two methods were developed for the solution of the integral equation in relation to the density of the potential of a simple layer. Equation one (1) is integral-differential, and is transformed in this article. A solution for integral equation two (2) is given using the method of the indefinite parameter.
AD-653 951 HC$3.00 MF$0.65

ON THE PROBLEM OF DETERMINING THE DEFLECTION OF THE VERTICAL ON THE BASIS OF MOLODENSKII'S THEORY,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
V. P. Stoikov. Jun 67, 22p
ACIC-TC-1202, TT-67-62141
K Voprosu ob Opredelenii Ukloneniya Otvesa na Osnove Teorii Molodenskogo. Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Geodeziya i Aerofotosemka (USSR) n3 p75-87 1966.

Descriptors: (*Geodesics, Theory), Gravity, Anomalies, Earth (Planet), Integrals, Surface properties, Terrain, Equations.

The article discusses Molodenskiy's formula in showing that the value at a point on the earth surface of the derivative with respect to the direction perpendicular to the normal to the reference surface can be obtained. The article also shows that the value of the derivative with respect to the indicated normal can also be obtained on the basis of this formula for the derivation of expressions of proper gravity anomalies. (Author)
AD-653 953 HC$3.00 MF$0.65

ON THE PROBLEM OF INTERPOLATING DERIVATIVES OF THE GRAVITY POTENTIAL IN A MOUNTAINOUS REGION.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
V. I. Aronov, and V. M. Gordin. Jun 67, 12p
ACIC-TC-1203, TT-67-62135
K Voprosu ob Interpolyatsii Proizvodnykh Gravitatsionnogo Potentsyala v Gornoi Oblasti, trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Geodeziya i Aerofotosemka (USSR), n3 p88-93 1966.

Descriptors: (*Geodesics, *Gravity), Anomalies, Mountains, Errors, Numerical analysis, Tables, Equations.

These articles deal with problems connected with the precision increase of the interpolation of delta g values in a mountainous region, together with the precision of the computation of derivatives of the gravitational potential (from the point of view of evaluating the magnitude of their interpolation errors) during calculations by the methods described. (Author)
AD-653 958 HC$3.00 MF$0.65

GRAVITY MEASUREMENT INSTRUMENT.
Technical translation.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
V. P. Kheifets Jun 67, 9p
ACIC-TC-1191, TT-67-62154
Ustroistvo dlya Izmereniya Sily Tyazhesti, trans. of Byullenten Izobretenii i Tovarnykh Znatov (USSR), n15 p89-90 1965.

Descriptors: (*Gravity, Measurement), Meters, Hygrometers, Time, Accuracy, Mirrors, Thermometers, Submarines, USSR.

Seven instruments for measuring gravity are described in the article. (Author)
AD-653 960 HC$3.00 MF$0.65

THEORY OF MEASUREMENT OF GRAVITY FROM AIRPLANES WITH THREE ORTHOGONAL SLIDE-WIRE TRANSMITTERS. PART II.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
Yu. A. Tarakanov. Jun 67, 29p
ACIC-TC-1190, TT-67-62155
Teoriya Izmereniya Sily Tyazhesti s Samoleta Tremya Ortogonalnymi Strunnymi Datchikami, trans. of Akademiya Nauk SSSR. Izvestiya. Fizika Zemli, n10 p72-82 1965.

Descriptors: (*Gravity, Measurement), Airplanes, Transmitter-receivers, Wire, Mathematical analysis, Airborne, USSR.

The paper discusses the theory of measurement of gravity from airplanes with three orthogonal slide-wire transmitters. (Author)
AD-653 961 HC$3.00 MF$0.65

EARTH EXPANSION; GENERAL RELATIVITY; PROBLEMS OF ABSTRACT ALGEBRA.
Hamburg Univ (Germany)
For primary bibliographic entry see Field 8G.
AD-653 981 HC$3.00 MF$0.65

OPTIMUM SMOOTHING OF AERIAL GRAVITY MEASUREMENTS,
Ohio State Univ Columbus Dept of Geodetic Science
Helmut Moritz. Mar 67, 61p Rept no. Scientific-13, DGS-81
AFCRL-67-0169
Contract AF 19 (628)-5701

Descriptors: (*Gravity, Measurement), Geodesics, Electric filters, Least squares method, Errors, Integral transforms, Digital computers, Electrical networks, Stochastic processes, Anomalies, Spectroscopy, Time series analysis, Airborne, Noise, Meters, Numerical analysis.

The smoothing of aerial gravimeter records is investigated theoretically using the theory of stationary stochastic processes (time series). Two methods of optimum filtering are considered: first, least-squares filtering, due to Norbert Wiener, where the r.m.s. error is minimized absolutely; and second, equal-spectrum filtering, where the r.m.s. error is minimized subject to the condition of least distortion as expressed by preservation of spectrum. The equal-spectrum method seems to be more appropriate for aerial gravimetry because of the high noise level and has a considerable practical advantage. Emphasis is on digital computation, for which practical formulas are given; analog computation by means of electric networks is outlined. (Author)
AD-654 008 HC$3.00 MF$0.65

LATITUDE VARIATIONS AND POLAR MOTIONS - ARTICLES, NO. 3.
Academy of Sciences (USSR), Moscow. Soviet Geophysical Committee.
1965, 94p
in Russian, English Summaries

Descriptors: *Geophysics, *International geophysical year (igy), *Meteorology, *Polar coordinate, Coordinate, Earth surface, International, Latitude, Latitude sensing, Observation, Polar, Smoothing, Telescope, Temperature effect, Troposphere, U.S.S.R., Year, Zenith.

For abstract, see STAR 05 15.
N67-28072 HC$3.00 MF$0.65

8F. GEOGRAPHY

GEOGRAPHY AND THE PROPERTIES OF SURFACES. CONCEPTS AND APPLICATIONS-SPATIAL ORDER.
Paper no. 1, Harvard Papers in Theoretical Geography,
Harvard Univ Cambridge Mass Lab for Computer Graphics
William Warntz, and Michael Woldenberg. 16 May 67, 195p Rept no. TR-1
Prepared in cooperation with American Geophysical Society, New York, Contract N00014-66-C-0121, Proj. NR-389-147.

Descriptors: (*Geography, Theory), (*Mapping, Mathematical analysis), Topology, Geometry, Terrain, Graphics, Surfaces, Rivers, Glaciers.

Contents: Part I: Demonstration of a general property of closed surfaces; An additional graphical portrayal; Contour lines; Varying the contour interval and singular points; Singular points and lines; Hill and dales and territories; Surfaces and the mathematical functions of three variables; Multiple passes and pales; Hill, dales, territories and general topological considerations; The indicatrix; Surfaces, flows, and dimensions; Part II: Exponential and allometric growth as most probable states for open systems; On the ordering of tree-like course lines on surfaces; The example of the river; On the ordering of tree-like course lines on surfaces: The example of mountain glaciers; On the ordering of points in areas: The example of a central place system for human activities; On the similarities and differences between tree-like and web-like open systems; A theory of geomorphic cyclical evolution based on the graded profile; The potential of population surface and flows; Fronts in the atmosphere and hydrosphere and other discontinuities.
AD-653 464 HC$3.00 MF$0.65

AN OBJECTIVE TECHNIQUE FOR FORECASTING STRATUS AND ADVECTION FOG AT SUFFOLK COUNTY AIR FORCE BASE WESTHAMPTON BEACH, NEW YORK,
Weather Squadron (12) Suffolk County AFB N Y Detachment
For primary bibliographic entry see Field 4B.
AD-653 585 HC$3.00 MF$0.65

JUNGLE ACOUSTICS II: LOCALIZATION OF SOUNDS IN THE JUNGLE.
Army Tropic Test Center Fort Clayton Canal Zone
For primary bibliographic entry see Field 20A.
AD-653 619 HC$3.00 MF$0.65

TERMINAL FORECAST REFERENCE FILE FOR ENT AIR FORCE BASE (PETERSON FIELD), COLORADO SPRINGS, COLORADO.
Weather Wing (4th) Ent AFB Colo
For primary bibliographic entry see Field 4B.
AD-653 629 HC$3.00 MF$0.65

TEST OF QUANTITATIVE TERRAIN DESCRIPTION SYSTEMS AT FORT LEONARD WOOD, MISSOURI,
Missouri School of Mines and Metallurgy Rolla
For primary bibliographic entry see Field 8B.
AD-653 631 HC$3.00 MF$0.65

THE ARRANGEMENT AND DIMENSIONS OF RURAL SETTLEMENTS OF THE NORTHEAST COASTAL ZONE OF TANGANYIKA, PANGANI DISTRICT.
Technical rept.,
Illinois Univ Urbana Dept of Geography
D. Robert Altschul. 1967, 207p Rept no. TR-3
Contract Nonr-1834 (35)

Descriptors: (*Rural areas, *Tanganyika), Geography, Seacoast, Culture, History, Anthropology, Distribution, Population, Environment.

The study has had the following two objectives: (1) to develop and apply a method of approach which may help to define tentatively the focus of settlement geography, and establish a methodology usuable in the study of settlements of different areas; and (2) to describe and analyze certain aspects of settlement arrangements and -dimensions of the Northeast Coastal Zone of Tanganyika, with emphasis on Pangani District--an area for which settlement studies have been sporadic, and have not been organized into a unified body. (Author)
AD-654 152 HC$3.00 MF$0.65

8G. GEOLOGY AND MINERALOGY

OCEANIC RESEARCH PROGRESS REPORT, JULY 1965 TO JUNE 1966.
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8J.
AD-653 434 HC$3.00 MF$0.65

THE INTERFACE BETWEEN ICE AND SILICATE SURFACES.

Cold Regions Research and Engineering Lab Hanover N H
For primary bibliographic entry see Field 8M.
AD-653 612 HC$3.00 MF$0.65

MINERALOGICAL AND PETROGRAPHIC STUDIES OF SIMULATED LUNAR MATERIAL,
Army Engineer Research and Development Labs Fort Belvoir Va
For primary bibliographic entry see Field 3B.
AD-653 618 HC$3.00 MF$0.65

OCEANOGRAPHIC RESEARCH.
Lamont Geological Observatory Palisades N Y
For primary bibliographic entry see Field 8J.
AD-653 878 HC$3.00 MF$0.65

ISOSTASY OF ANTARCTICA.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
S. A. Ushakov, and A. I. Frolov. Jun 67, 12p
ACIC-TC-1212, TT-67-62142
Izostaziya Antarktidy, trans. of Akademiya Nauk SSSR. Doklady, v160 n4 p819-22 1965.

Descriptors: (*Antarctic regions, *Isostatic change), Terrain, Gravity, Numerical analysis, Theory, Polynomials, Tables, USSR.

Because of the complexity of isostatic anomaly computations, the conclusion on the isostatic state of Antarctica was originally drawn by averaged anomalies with a free-air reduction. However, B. A. Andreyev drew the conclusion that at the center of Antarctica one can expect to discover intensive negative isostatic anomalies of the order of 80 mgals. In this article the authors independently and by different methods attempted to find answers to the given conclusions. (Author)
AD-653 952 HC$3.00 MF$0.65

EARTH EXPANSION; GENERAL RELATIVITY; PROBLEMS OF ABSTRACT ALGEBRA.
Final rept.,
Hamburg Univ (Germany)
Pascual Jordan. 15 Feb 67, 61p
ARL-67-0122
Contract AF 61 (052)-567

Descriptors: (*Earth (Planet), Geophysics), (*Relativity theory, Equations of motion), (*Algebras, Mathematics), Gravity, Continental shelves, Oceans, Geodesics, Volcanoes, Mountains, Geologic age determination, Glaciers, Mathematical analysis.

Contents: Comparison with Wegeners ideas; Paleoclimatology in Wegeners and in the new theory; Ramsey's hypothesis about the interior of the earth; Quantitative values about Dirac's hypothesis; Field equations and equations of motion in general relativity; Problems of abstract algebra.
AD-653 981 HC$3.00 MF$0.65

EXPERIMENTAL COMPACTION EFFECTS IN CARBONATE SEDIMENTS.
Revised ed.,
Columbia Univ New York
L. S. Fruth, Jr., G. R. Orme, and F. A. Donath.
8 Apr 66, 10p
AROD-3055:2
Contract DA-31-124-ARO (D)-121, Grant DA-ARO (D)-31-124-G149
Revision of manuscript received 19 Feb 66. Research supported in part by American Chemical Society.
Availability: Published in Journal of Sedimentary Petrology v36 n3 p747-54 Sep 1966.

Descriptors: (*Petrology, Sedimentary rock), (*Sedimentary rock, Carbonates), Bahama Islands, Soil mechanics, Pressure, Porosity, Fracture (Mechanics).

Experimental compaction of modern carbonate sediment from five Bahamian facies has produced spalling of oolite borders, grain interpenetration, fractures, and other features found in natural limestones. These features can be related to sediment type, and to pressure, compaction, and porosity conditions. Most of the sediment types tested show a marked initial compaction below about 30 bars pressure, but above 350 bars the compaction curves are nearly parallel. Even with large differences in initial and final porosity, all show approximately 35 percent porosity at 120 bars pressure; the porosity decreases with increasing pressure. (Author)
AD-654 067 Not available from CFSTI.

A TRIAXIAL PRESSURE APPARATUS FOR TESTING OF CONSOLIDATED MATERIALS SUBJECTED TO PORE PRESSURE,
Columbia Univ New York
F. A. Donath. 1966, 15p
AROD-3055:3
Contract DA-31-124-ARO (D)-121
Availability: Published in Testing Techniques for Rock Mechanics Special Pub-402 p41-51 1966.

Descriptors: (*Test equipment, *Rock (Geology)), Pressure, Soil mechanics, Porosity, Creep, High-pressure research, Petrology.

To determine the effects of different stress states and pore pressure on the compaction of sediment and on the deformational behavior of rock, a triaxial apparatus was developed that permits control of pore pressure during triaxial testing of materials under high confining pressure. The apparatus is designed for use with 1-in. diameter by 2-in. length specimens subjected to confining pressures and pore pressures up to 30,000 psi and axial stress up to 130,000 psi. The axial load can be held constant or varied continuously during testing. The compact nature of the apparatus permits mobility that makes the apparatus particularly desirable where field testing is necessary. (Author)
AD-654 068 Not available from CFSTI.

COMPILATION OF REPRINTS.
Oregon State Univ Corvallis Dept of Oceanography
For primary bibliographic entry see Field 8A.
AD-654 138 Not available from CFSTI.

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, 1965. VOLUME I. BROWN BEAR CRUISE 352: 11-28 JANUARY, BROWN BEAR CRUISE 357: 14-28 APRIL, BROWN BEAR CRUISE 368: 4-22 AUGUST, BROWN BEAR CRUISE 380: 3-18 NOVEMBER.
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8A.
AD-654 172 HC$3.00 MF$0.65

8H. HYDROLOGY AND LIMNOLOGY

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, 1965. VOLUME I. BROWN BEAR CRUISE 352: 11-28 JANUARY, BROWN BEAR CRUISE 357: 14-28 APRIL, BROWN BEAR CRUISE 368: 4-22 AUGUST, BROWN BEAR CRUISE 380: 3-18 NOVEMBER.
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8A.
AD-654 172 HC$3.00 MF$0.65

8J. PHYSICAL OCEANOGRAPHY

OCEANIC RESEARCH PROGRESS REPORT, JULY 1965 TO JUNE 1966.
Scripps Institution of Oceanography La Jolla Calif
31 Mar 67, 98p Rept no. SIO-Ref-66-5
Contracts Nonr-2216 (23), Nonr-2216 (12)

Descriptors: (*Oceanographic data, Reports), Ocean bottom, Anomalies, Surface temperatures, Microseisms, Depth indicators, Carbon dioxide, Tides, Rayleigh waves, Pacific ocean, Indian ocean, Morphology (Biology), Temperature, Geochemistry, Ocean bottom sampling, Bathythermograph data, Isotopes, Minerals, Sedimentation, Ocean bottom topography, Foraminifera.

Contents: Estimation of mean monthly anomalies of sea-surface temperatures; Measurement of seismic background noise on the ocean bottom; Studies of electromagnetic induction within and below the sea; A study of bottom currents of tidal and longer period and a numerical study of tides; On the wind-driven ocean circulation; Studies of tides; Pacific water mass movements; Bathythermograph analysis and processing; Equatorial currents in the Indian Ocean; Waves; Arabian sea studies; Ocean boundary studies; Geochemistry of lead isotopes; Fallout observations in the Pacific 1965-1966; Carbon dioxide project; Air-sea exchange of water and gases; isotopic water molecules and dissolved gases in the sea; Geochemistry of deep sea sediments; Minerals, Marine sediments; Marine geology of the continental margin; Topography and structure of ocean basins; Sediment and structural studies; Sonic-scattering layers studies; Effects of shallow bottom organisms; Studies of foraminifera and their applications to problems of oceanography; Mechanics of sedimentation; Deep sea sediments and radiolaria; Sea floor topography; Underwater sampling devices and methods; Submarine valley studies; Oceanographic engineering.
AD-653 434 HC$3.00 MF$0.65

PORTABLE DEPTH ECHO SOUNDING TESTS-MODIFIED RAYTHEON DE-723B FATHOMETER WITH A NARROW BEAM TRANSDUCER.
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 13J.
AD-653 445 HC$3.00 MF$0.65

THE INFLUENCE OF SURFACE-ACTIVE MATERIAL ON THE PROPERTIES OF AIR BUBBLES AT THE AIR/SEA INTERFACE,
Naval Research Lab Washington D C
W. D. Garrett. 8 May 67, 19p Rept no. NRL-6545

Descriptors: (*Sea water, *Foams), (*Surface-active substances, *Bubbles), Monomolecular films, Interfaces, Air, Surface tension, Molecular association, Organic materials, Fatty acids, Siloxanes, Fatty acid esters, Glycols.

The lifetimes of single air bubbles were measured at water surfaces covered by various monomolecular films. Simultaneous measurements of bubble lifetime .vs molecular area and film pressure vs area were made using air bubbles of various diameters. As the film pressure increased, the bubble lifetime passed through a maximum at about 1 dyne/cm and decreased at higher pressure with closer molecular packing. Mechanisms to account for this effect were based on surface tension gradient flow and dilational viscous forces within the film. The bubble stability data were used to describe molecular interactions and orientations within the stabilizing monolayer. The lifetimes of bubbles at an air/sea interface were shown to be dependent upon the concentration of organic material in the water and the surface-chemical condition of the sea surface. The presence of a coherent surface film substantially reduced bubble stability, especially at elevated film pressures. (Author)
AD-653 458 HC$3.00 MF$0.65

PRELIMINARY REPORT ON THE TEXAS A AND M EASTROPAC CRUISE, 21 JANUARY TO 10 APRIL 1967.
Technical rept.,
Texas A and M Univ College Station Dept of Oceanography
John D. Cochrane. May 67, 29p Rept no.
TAMU-Ref-67-5-T
Contract Nonr-2119 (04)

Descriptors: (*Oceanographic data, *Pacific ocean), (*Oceanology, Reports), Marine biology, Periodic variations, Salinity, Ocean bottom sampling, Surface properties, Temperature, Ocean currents, Sea water, Ocean bottom topography, Samplers, Weather, Metals, Salinometers, Bathythermograph data, Caribbean Sea, Mexico Gulf, Maps.
Identifiers: EASTROPAC.

Texas A and M research vessel ALAMINOS participated in the EASTROPAC studies of the eastern tropical Pacific during February, March, and April, 1967. Physical, meteorological, biological, and chemical data collected during the cruise are outlined. Preliminary results in physical oceanography for the region east of the Galapagos and north of 15 degrees S are presented. New techniques are described. (Author)
AD-653 737 HC$3.00 MF$0.65

VERTICAL AND HORIZONTAL THERMAL STRUCTURES IN THE SEA.
Research and development rept.,
Navy Electronics Lab San Diego Calif
E. C. LaFond, and K. G. LaFond. 29 Jul 66, 129p
Rept no. NEL-1395

Descriptors: (*Sea water, *Temperature), (*Thermistors, Towed bodies), Thermoclines, Ocean bottom sampling, Thermal properties, Samplers, Underwater sound, Oceanographic data, Power spectra, Turbulence, Motion, Chains, Depth indicators, Ocean currents, Accuracy, Measurement, Velocity, Salinity, California, Mexico Gulf.

The sea temperature structure of the upper layers was investigated by the use of a thermistor chain towed off the southern extremity of Baja California, Mexico, which revealed vertical and horizontal motion, large scale turbulence, and possible Doppler effects. The thermoclines were categorized in four types, smooth, normal, rough, and irregular. The power spectrum of vertical oscillation in the thermocline showed small peaks at wavelengths of 0.3 and 0.7 mile. The slopes of isotherms were determined from a study of over 65,000 data samplings. (Author)
AD-653 739 HC$3.00 MF$0.65

OCEANOGRAPHIC RESEARCH.
Progress rept. no. 9, 1 Jan-31 Dec 65.
Lamont Geological Observatory Palisades N Y
1966, 34p
Contract Nonr-266 (48)

Descriptors: (*Oceanology, *Oceanographic data), Stratigraphy, Oceanographic vessels, Marine geology, Sedimentation, Ocean bottom, Sedimentary rock, Reflection, Seismology, Terrestrial magnetism, Refraction, Gravity, Ocean bottom sampling, Thermal properties, Paleontology, Deep water, Plankton.

The report contains information on the following: marine geology, the sediments, their character, distribution and origin, the structure of the ocean basins and the tectonic features found within them; the physiography of the ocean floor; marine geophysics, including seismology--reflection as well as refraction--gravity, magnetism, and geothermal measurements; and physical oceanography. (Author)
AD-653 878 HC$3.00 MF$0.65

COMPILATION OF REPRINTS.
Oregon State Univ Corvallis Dept of Oceanography
For primary bibliographic entry see Field 8A.
AD-654 138 Not available from CFSTI.

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, 1965. VOLUME I. BROWN BEAR CRUISE 352: 11-28 JANUARY, BROWN BEAR CRUISE 357: 14-28 APRIL, BROWN BEAR CRUISE 368: 4-22 AUGUST, BROWN BEAR CRUISE 380: 3-18 NOVEMBER.
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8A.
AD-654 172 HC$3.00 MF$0.65

8K. SEISMOLOGY

OCEANIC RESEARCH PROGRESS REPORT, JULY 1965 TO JUNE 1966.
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8J.
AD-653 434 HC$3.00 MF$0.65

SEISMIC DIFFRACTION BY CRUSTAL DISCONTINUITIES.
Final rept., 1 Jan 62-30 Sep 66,
Rhode Island Univ Kingston Dept of Electrical Engineering
Julius Kane. 15 Jan 67, 101p
AFCRL-67-0122
Contract AF 19 (628)-319, ARPA Order-180-62

Descriptors: (*Seismic waves, *Diffraction), Rayleigh waves, Boundary value problems, Seismology, Theory, Mathematical analysis, Reflection, Mechanical waves, Approximation (Mathematics), Integral equations, Wave functions, Stratigraphy, Velocity, Phase shift, Surface properties, Fiber optics, Equations, Tables, Geometry, Differential equations.

The report describes the research contributions of a group studying theoretical problems of seismic diffraction at the University of Rhode Island. These problems are described in simplified terms and formulations which are mathematically tractable and still relevant to realistic crustal structures. Reprints of papers describing the methods are included as appendices in the report. (Author)
AD-653 582 HC$3.00 MF$0.65

ON AN EARTHQUAKE AND AFTERSHOCK MECHANISM RELATING TO A MODEL OF THE CRUST AND MANTLE,
California Univ Berkeley Office of Research Services
Paul Lieber, and David Braslau. Oct 65, 147p
Rept no. AM-65-8
Contract Nonr-222 (87)

Descriptors: (*Earthquakes, *Sequences), Time, Seismic waves, Elasticity, Sequential analysis, Boundary value problems, Integral transforms, Surface properties, Glaciers, Creep, Numerical analysis, Viscoelasticity, Earth (Planet), Mathematical analysis, Faults (Geology), California.

A layered half-space is presented as a model for the crust-mantle system of the earth. Elastic and inelastic properties are attributed to both media. The primary purpose of this report is to study time sequences of shallow earthquakes, with special consideration of the material properties of the crust and mantle. The earthquake mechanism is modelled after the San Andreas Fault in California, and is considered as a discrete Volterra type dislocation. A three-dimensional boundary value problem in static linear elasticity, where the material is assumed to be incompressible, is solved by means of a modified form of the Galerkin vector and use of double Fourier transforms. The solution is shown to reduce to the classical one obtained for the half-space. Time dependent properties are introduced into the system by means of Biot's correspondence principle of linear viscoelasticity. Solutions are obtained in quadrature for the surface displacements and some stresses at the interface. A brief discussion of postglacial uplift and its relation to the inelastic properties of the system is included. Experiments and observations which may be needed for numerical calculations are suggested. (Author)
AD-653 880 HC$3.00 MF$0.65

THREE-DIMENSIONAL FIELDS PRODUCED BY A VOLTERRA DISLOCATION IMBEDDED IN A LAYERED HALF-SPACE: ANALYTICAL REPRESENTATION OF A SEISMIC MECHANISM,
California Univ Berkeley Office of Research Services
David Braslau, and Paul Lieber. Dec 65, 135p
Rept no. AM-65-14
Contract N00014-66-C-0057-A03

Descriptors: (*Earthquakes, Boundary value problems), Integral equations, Elasticity, Seismic waves, Integral transforms, Surface properties, Viscoelasticity, Earth (Planet), Seismology, Vector analysis, Mathematical analysis, Time, Faults (Geology), California.

A three-dimensional boundary value problem in static linear elasticity is presented as a restricted formal characterization of a conceptual model for the crust-mantle system of the earth. The system is considered as a two-layered half-space, where elastic and inelastic properties are attributed to both media. It is assumed that both materials are incompressible. A Volterra dislocation, representing a fault plane, is imbedded in the upper layer, lying in a vertical plane with slip parallel to the free surface. The problem is solved by means of a modified form of the Galerkin vector and use of double Fourier transforms. Solutions are obtained in quadrature for the surface displacements and some stresses at the interface. Time dependent properties are introduced into the system by means of Biot's correspondence principle of linear viscoelasticity. This investigation is a segment of a comprehensive study in geomechanics, based upon a more complete conceptual and ontological model of the crust and mantle, which may prove essential for implementing an effective shallow-earthquake prediction program. (Author)
AD-653 920 HC$3.00 MF$0.65

SITE SELECTION FOR A SEISMIC ARRAY STATION AND CRUSTAL STUDIES IN NORWAY 1965.
Final scientific rept., 1 Apr 65-31 Dec 66,
Bergen Univ (Norway) Seismological Observatory
Anders Sornes, and Markvard A. Sellevoll. 1967, 109p
AFOSR-67-1370
Contract AF 61 (652)-859, ARPA Order-612-1
Rept. on proj. VELA-UNIFORM.

Descriptors: (*Site selection, *Seismological stations), Seismic waves, Antenna arrays, Velocity, Seismographs, Noise, Stratigraphy, Refraction, Magnetic tape, Thickness, Measurement, Recording systems, Phase modulation, Motion, Terrain, Signal-to-noise ratio, Time, Accuracy, Tables, Maps, Norway.

A study of a possible relocation of the seismic array station LHN (Lillehammer) in south-central Norway is first reported in Part I. One new site is recommended. Part II reports results obtained from three widely separated seismic refraction profiles in Norway and a travel time study for seismic

waves in Fennoscandia. The Pn velocities found are very close to 8.20 km/sec. Indications of a phase with velocity of 7.50 km/sec are observed. A phase with a velocity of about 6.60 km/sec is well defined in the seismograms. The amplitude for this phase varies strongly. The velocity for the first direct longitudinal wave varies mostly from 6.00 km/sec to 6.15 km/sec. A crustal thickness from 31 km to 38 km has been determined. (Author)
AD-653 979 HC$3.00 MF$0.65

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, 1965. VOLUME I. BROWN BEAR CRUISE 352: 11-28 JANUARY, BROWN BEAR CRUISE 357: 14-28 APRIL, BROWN BEAR CRUISE 368: 4-22 AUGUST, BROWN BEAR CRUISE 380: 3-18 NOVEMBER.
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8A.
AD-654 172 HC$3.00 MF$0.65

8L. SNOW, ICE, AND PERMAFROST

THE INTERFACE BETWEEN ICE AND SILICATE SURFACES.
Cold Regions Research and Engineering Lab Hanover N H
For primary bibliographic entry see Field 8M.
AD-653 612 HC$3.00 MF$0.65

ICEFIELD RANGES CLIMATOLOGY PROGRAM: 1965 DATA PRESENTATION AND PROGRAMMING ANALYSIS.
Research paper,
Arctic Inst of North America Montreal (Quebec)
Melvin G. Marcus, Franklin Rens, and Bea E. Taylor. Apr 66, 119p Rept no. AINA-RP-38
USA-NLABS-TR-67-84-ES
Contract DA-19-129-AMC-660 (N)

Descriptors: (*Ice, *Climatology), (*Weather forecasting, *Data processing systems), Weather stations, Clouds, Temperature, Weather, Atmospheric precipitation, Humidity, Tables, Alaska, Canada.

The report describes the 1965 climatology program of the Ice field Ranges Research Project, Arctic Institute of North America. A method whereby weather data were processed, programmed, and reproduced is also discussed. 1965 weather data are given for four summer field stations across the St. Elias mountains, Yukon. Records include temperature, precipitation, pressure, relative humidity, cloud cover, wind direction and speed. (Author)
AD-653 626 HC$3.00 MF$0.65

SEA ICE STRENGTH.
Final rept., 1958-1965,
Alaska Univ College Geophysical Inst
Harold R. Peyton. Dec 66, 271p Rept no. UAG-R-182
Contract Nonr-2601 (01)

Descriptors: (*Sea ice, Mechanical properties), Compressive properties, Tensile properties, Experimental data, Structural properties, Failure (Mechanics), Arctic Ocean, Alaska.
Identifiers: Cook Inlet.

The report contains the results from a study of the mechanical and structural properties of sea ice; the study commenced in 1958 and was completed in late 1965. Most of the experimental work is based upon stress-strain tests in both direct compression and direct tension. Approximately 3800 of these tests were made. Those parameters anticipated to have significant effect upon strength were measured: temperature, salinity, rate of loading, crystal size, crystallographic orientation, history of the ice and depth in the ice sheet. All of these are found to be significant except that the history factor itself tended to be determined by the other parameters. The analysis was accomplished primarily by testing models by linear multiple regression. The models selected yield good results with multiple correlation coefficients between 0.70 and 0.98 over a range of petrofabric types. Additional work accomplished in conjunction with construction of offshore oil drilling platforms had provided significant information concerning oscillatory failure of sea ice in compression and strength reduction at very high load rates. The ice failure force oscillation is an ice property and is not primarily a function of the response of the structure. The magnitude of oscillation is large and at a frequency in the range of most space frame structures. The failing ice may cause forced resonant vibration in structures, and the forces are large enough to resonantly vibrate structure weighing several thousand tons. (Author)
AD-653 883 HC$3.00 MF$0.65

COMPACTED-SNOW RUNWAYS IN ANTARCTICA - LIMITATIONS OF CONTAMINATED SNOW.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 1E.
AD-654 140 HC$3.00 MF$0.65

8M. SOIL MECHANICS

SUMMARY REVIEWS OF SOIL STABILIZATION PROCESSES. REPT. 6. MIXING PRINCIPLES, TECHNIQUES AND EQUIPMENT.
Army Engineer Waterways Experiment Station Vicksburg Miss
May 61, 37p Rept no. Miscellaneous Paper-3-122

Descriptors: (*Soil mechanics, Reviews), Soils, Particle size, Efficiency, Moisture, Weight, Stability, Mixtures, Plasticity, Grain size, Vehicles, Laboratories, Clay, Design, Tests.

The purpose of this report is to summarize the current status of mixing and mixer development, particularly the aspects of the principles employed that may lead to more efficient designs and techniques for incorporating potential stabilizers in wet, fine-grained soils. The report points out the advantages and limitations of presently available items of equipment, discusses factors contributing to the efficiency of mixing, and presents the findings of laboratory mixing investigations. The information presented herein was obtained solely from available technical literature. Only material published in or translated to English was reviewed. Although numerous investigations have been made and reported by many individuals and organizations, very little of the work involved fine-grained soils under wet conditions similar to those which would probably be encountered during military operations in forward areas. In the few instances where mixing of wet, fine-grained soils has been investigated, the studies were conducted primarily on a laboratory basis.
AD-653 583 HC$3.00 MF$0.65

LABORATORY INVESTIGATION OF SOIL INFILTRATION THROUGH PIPE JOINTS.
Final rept.,
Army Engineer Waterways Experiment Station Vicksburg Miss
Eugene H. Nettles, and Joseph R. Compton. Jun 67, 55p Rept no. TR-3-781
Availability: Available from Army Engineer Waterways Experiment Station, Vicksburg, Miss., $1.00.

Descriptors: (*Soils, *Laboratories), (*Pipes, *Joints), Classification, Sand, Clay, Drainage, Physical properties, Cracks, Storms, Design, Models (Simulations), Tables, Photographs, Silt, Tests.

A laboratory investigation was made to develop a system of classifying soils according to the degree that soil infiltration through openings in joints or seams of pipe in storm-drain systems can be expected to occur. The soils tested were a poorly graded, medium to fine sand, a uniformly graded, fine sand, a silt, and a lean clay. The investigation included design and construction of a model simulating a prototype pipe joint, study of the feasibility of using the model for such studies, investigation of the variables affecting soil infiltration, and investigation of the infiltration characteristics of the four soils. Results showed that the model provided a feasible means of studying soil infiltration through pipe joints. The important factors leading to such infiltration are soil grading, density, and size and configuration of joint opening. Relations between these variables were indicated for the soils tested. The study also indicated that externally induced vibration has a significant effect on infiltration of cohesionless soil. The importance of determining the size of pipe-joint openings existing in field installations of various sizes and types of drainage pipe was recognized. Although the model simulated pipe-joint openings, the test results are applicable to other types of pipe openings such as cracks in rigid pipe. (Author)
AD-653 599 MF$0.65

THE INTERFACE BETWEEN ICE AND SILICATE SURFACES.
Research rept.,
Cold Regions Research and Engineering Lab Hanover N H
Duwayne M. Anderson. Mar 67, 39p Rept no. CRREL-RR-219

Descriptors: (*Ice, *Surface properties), (*Silicates, *Soil mechanics), Montmorillonite, Soils, Freezing, Clay, Thermodynamics, Phase studies, Supercooling, Crystal lattices, Water, Physical properties, Freezing point depressants, Crystal structure, Solutions, Tests, Surface tension, Cold weather tests.

Experiments have been conducted with a particular layer lattice silicate, montmorillonite, in order to study the interaction of water and ice with silicate surfaces. The structural features of this class of silicate minerals are described, and other aspects which have a particular bearing on interfacial phenomena are discussed. Emphasis is placed on the nature of water and aqueous solutions, mechanisms of clay-water interaction, physical and thermodynamic properties of clay-adsorbed water, freezing point depression and supercooling, the existence of unfrozen interfacial water, spatial distribution of unfrozen water, the nature of the ice phase, and phase relationships. (Author)
AD-653 612 HC$3.00 MF$0.65

AN ANALYSIS OF THE TRIAXIAL TEST FOR COHESIONLESS SOILS,
Brown Univ Providence R I Div of Engineering
Paul R. Paslay, and Jay B. Weidler. May 67, 32p
Contract SD-86

Descriptors: (*Soil mechanics, *Analysis), Deformation, Stability, Equations, Stresses, Compressive properties, Hydrostatic pressure, Soils, Tests.

Several implications of an earlier analytical formulation for cohesionless soils are deduced for the triaxial test (a compression test in the presence of a hydrostatic pressure). A specific form for the loading surface is adopted in order to illustrate certain difficulties associated with uniqueness and stability. In certain important respects the limited analytical and numerical results appear to agree with experience in soil mechanics testing. (Author)
AD-653 858 HC$3.00 MF$0.65

Group 8M—Soil mechanics

SOIL COMPACTION STUDY, VOLUME I. INTRODUCTION AND RESULTS OF INITIAL PHASES,
IIT Research Inst., Chicago, Ill.
E. T. Selig. Mar 67, 196p
Contract CPR-11-1458
See also volume 2, PB-174 877, and volume 3, PB-174 878.

Descriptors: (*Soil mechanics, *Tests), Soils, Measurement, Calibration, Roads, Sampling, Moisture, Nuclear properties, Instrumentation, Test methods, Clay, Test equipment, Sand, Portable, Tables, Density, Road-building equipment, Laboratories, Silt, Seismographs, Mathematical analysis.

A study has been undertaken to determine: the desired characteristics of compacted soils, the best method for measurement and specification of proper compaction, and the effectiveness of various ways of achieving compaction. This report is Volume I of a series of final reports presenting the results of the study. The research was divided into four basic phases: field pilot studies, laboratory studies, field test program, and data reduction and analysis. This volume covers the field pilot and the laboratory studies. The latter includes: evaluation and calibration of portable nuclear soil moisture-density gages, development of automated penetrometer-plate-CBR apparatus, evaluation of cone penetrometer characteristics, classification of the subgrade soils and base course materials, investigation of the moisture-density-strength relationships of the subgrade soils and base course materials, and examination of degradation due to laboratory and field methods of compaction.
PB-174 876 HC$3.00 MF$0.65

SOIL COMPACTION STUDY. VOLUME II. FIELD TEST APPARATUS AND PROCEDURES,
ITT Research Inst., Chicago, Ill.
E. T. Selig, and W. B. Truesdale. Apr 67, 150p
Contract CPR-11-1458
See also volume 1, PB-174 876, and volume 3, PB-174 878.

Descriptors: (*Soil mechanics, *Tests), Soils, Measurement, Sampling, Penetration, Seismographs, Portable, Backscattering, Nuclear properties, Instrumentation, Clay, Tables, Computers, Sand, Humidity, Silt, Moisture, Laboratories, Meters, Vibrators (Mechanical), Road-building equipment.

The report is Volume II of a study on compacted soils. The volume discusses the scope of the field tests and the basis for the plans. The apparatus and procedures for measuring the soil properties are described in detail. These include a penetrometer, bearing plate, CBR fixture, seismograph, portable backscatter nuclear gage and nuclear Road Logger. The pertinent characteristics of the commercial compaction equipment used in the study are given. The method of processing the data is outlined and then illustrated in detail by a sample set of field data sheets and a set of computer output showing the processed data. (Author)
PB-174 877 HC$3.00 MF$0.65

SOIL COMPACTION STUDY. VOLUME III. ANALYSIS OF FIELD TESTS OF SUBGRADE SOILS,
IIT Research Inst., Chicago, Ill.
E. T. Selig, W. B. Truesdale, and D. Hampton. Apr 67, 165p
Contract CPR-11-1458
See also volume 1, PB-174 876, and volume 2, PB-174 877.

Descriptors: (*Soil mechanics, *Tests), Soils, Measurement, Roads, Sampling, Penetration, Density, Portable, Nuclear properties, Instrumentation, clay, Seismographs, Tables, Computers, Humidity, Silt, Moisture, Mathematical analysis, Laboratories, Sand, Polynomials.

The report is Volume III of a study on compacted soils and contains the results of the study. Properties of the field compacted soils were found to be similiar to those compacted in the laboratory. Within the range of test conditions moisture content was found to be the most significant field variable, with soil type next in order of importance. The compactor type, level of compactive effort and thickness of lift also influenced the results in many cases. Strength properties continued to increase at sixteen coverages for most test conditions. Both dinsity and strength decreased with an increase in lift thickness. The magnitude of field variability was such that individual measurements would appear inadequate for compaction control. (Author)
PB-174 878 HC$3.00 MF$0.65

LIME REACTIVITY OF ILLINOIS SOILS.
Civil engineering studies: Highway engineering studies.
Illinois Univ., Urbana. Highway Research Lab.
M. R. Thompson. Nov 66, 29p Highway Engineering Ser-19
Prepared in cooperation with Illinois State Div. of Highways, Illinois Cooperative Highway Research Program Series-65.

Descriptors: (*Soils, *Illinois), Plasticity, Carbonates, Soil mechanics, Physical properties, PH, Solubility, Calcium, Silicates, Hydrates, Tables.

The addition of small quantities, 3% to 7% by weight, of lime to a soil will, in most cases, initiate modifications, but marked strength increases are not always obtained. The extreme variability of the strength increases indicates that lime-soil reactions depend on the nature and character of the soil being stabilized. To date, only limited information is available concerning the factors influencing the ability of a soil to react with lime and attain increased strength. It is apparent that lime cannot be used advantageously and economically as a soil stabilizing agent until lime-soil reactions and the factors influencing them are better understood. The primary objectives of this investigation were: (1) To determine the factors that significantly influence a soil's lime reactivity (ability of a soil to react with lime to achieve a strength increase); (2) to establish, in terms of fundamental lime-soil reactions, why these factors are significant; and (3) to establish guidelines and criteria for evaluating a soil's potential lime-reactivity. Realizing the extreme variations in properties that exist among soils, it was necessary to restrict the scope of this study. The investigation is limited to selected Illinois soils and reflects only the variability associated with them. (Author)
PB-174 930 HC$3.00 MF$0.65

8N. TERRESTRIAL MAGNETISM

A NEW METHOD OF COMPARING THE PERFORMANCE OF NEUTRON MONITORS,
Uppsala Univ (Sweden) Cosmic Ray Group
For primary bibliographic entry see Field 18D.
AD-653 580 HC$3.00 MF$0.65

A SYSTEM FOR AUTOMATIC COLLECTION OF GEOMAGNETIC DATA IN DIGITAL FORM.
Final scientific rept.,
Kiruna Geophysical Observatory (Sweden)
G. Gustafsson. 10 Feb 67, 24p
AFCRL-67-0281
Contract AF 61 (052)-237

Descriptors: (*Terrestrial magnetism, *Data processing systems), Digital computers, Storms, Magnetometers, Sampling, Accuracy, Sensitivity, Mathematical analysis, Performance (Engineering), Recording systems.

An equipment has been constructed and built for automatic collection of geomagnetic data. The report gives a summary of the scientific and technical achievements which have been made under the contract. A short description is also given of the data processing from raw data into a form suitable for publication in the traditional magnetic yearbook form. (Author)
AD-653 607 HC$3.00 MF$0.65

AURORAL-ZONE ELECTRON PRECIPITATION ACCOMPANYING A SUDDEN IMPULSE IN THE GEOMAGNETIC FIELD,
California Univ Berkeley Dept of Physics
Robert R. Brown. 30 Dec 66, 6p
AFOSR-67-1389
Grant AF-AFOSR-331-65
Availability: Published in Journal of Geophysical Research v72 n9 p2448-51 May 1 1967.

Descriptors: (*Terrestrial magnetism, *Storms), Aurorae, Electrons, Balloons, Energy, X rays, Intensity, Periodic variations.

Balloon observations of bremsstrahlung accompanying a sudden impulse of 955 gamma in H indicates that the x-ray fluxes were soft, with e-folding energy Eo approximately equals 13 keV, and relatively unstructured in time. (Author)
AD-653 814 Not available from CFSTI.

OCEANOGRAPHIC RESEARCH.
Lamont Geological Observatory Palisades N Y
For primary bibliographic entry see Field 8J.
AD-653 878 HC$3.00 MF$0.65

INTEGRAL METHODS OF INTERPRETING MEASUREMENTS IN ALTITUDE OF THE MAGNETIC FIELD,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
V. A. Larionov, and O. A. Solovev. Jun 67, 18p
ACIC-TC-1182, TT-67-62139
Integralnye Sposoby Interpretatsii Povysotnykh Izmerenii Magnitnogo Polya. Trans. of Prikladnaya Geofizika (USSR) n45 p202-11 1965.

Descriptors: (*Terrestrial magnetism, *Geophysical prospecting), Altitude, Iron, Ores (Metal sources), Deposits, Integrals, Errors, Measurement.

The problem of a quantitative interpretation of the data of measurements in altitude is of practical significance in aeromagnetic works, curing prospecting and exploration of iron ore deposits. The application of integral methods of interpretation of magnetic anomalies makes possible a simplification of the interpretation of magnetic exploration observations. In this article, several integral methods of interpretation of measurements in altitude of the magnetic field are suggested. (Author)
AD-653 955 MF$0.65

THEORY OF ELECTRIC FIELD MEASUREMENTS CONDUCTED IN THE MAGNETOSPHERE WITH ELECTRIC PROBES.
Royal Inst. of Tech., Stockholm (Sweden).
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 15.
N67-27924 HC$3.00 MF$0.65

SOME QUESTIONS IN THE HISTORY OF THE GEOMAGNETIC FIELD AT THE END OF THE MIDDLE PALEOZOIC AND IN THE UPPER PALEOZOIC.
Defence Research Board, Ottawa (Ontario).
V. P. Aparin, and A. YA. Vlasov. Oct 66, 10p T-461-R, AD-649522
Transl. Into English From the Book "nastoyashcheye I Proshloye Magnitnogo Polia Zemli" Moscow, "nauka" Press 1965 P 213-220

Descriptors: *Geomagnetic field, *History, Deposit, Ferrite, Ferromagnetism, Field, Geomagnetic, Paleomagnetism, Rock, Sediment, Stratigraphy, Terrestrial.

For abstract, see STAR 05 15.
N67-28561 HC$3.00 MF$0.65

PRELIMINARY STUDY OF PALEOMAGNETISM OF SOME MESOZOIC AND CENOZOIC RED BEDS OF SOUTH CHINA.
Defence Research Board, Ottawa (Ontario).
L. Chun, L. Haishan, C.-T. Lee, H.-M. Lee, and S.-J. Yeh. Oct 66, 10p T-8-C, AD-649525
Transl. Into English From Ti Chih Hsueh Pao (Guozi Shudian), V. 43, No. 3, Aug. 1963 P 241-246

Descriptors: *China, *Geomagnetism, *History, Bed, Geology, Paleomagnetism, Property, Red, Rock, Stratigraphy.

For abstract, see STAR 05 15.
N67-28563 HC$3.00 MF$0.65

SOME RESULTS OF PALEOMAGNETIC RESEARCH IN CHINA.
Defence Research Board, Ottawa (Ontario).
W. Cengchang, D. Xinghui, and C. Zhiqiang. Oct 66, 4p T-462-R, AD-649527
Transl. Into English From the Book "nastoyashcheye I Proshloye Magnitnogo Polia Zemli" Moscow, "nauka" Press 1965 P 309-311

Descriptors: *China, *Geomagnetism, *History, Bed, Correlation, Interval, Paleomagnetism, Property, Red, Rock, Stratigraphy, Time.

For abstract, see STAR 05 15.
N67-28566 HC$3.00 MF$0.65

NEW DATA ON THE PALEOZOIC HISTORY OF THE GEOMAGNETIC FIELD IN THE USSR. DIPOLE CHARACTER OF THE GEOMAGNETIC FIELD IN THE LATE CAMBRIAN AND THE ORDOVICIAN IN THE SOUTH OF THE SIBERIAN PLATFORM.
Defence Research Board, Ottawa (Ontario).
A. N. Khramov, R. A. Komissarova, and V. P. Rodionov. Oct 66, 24p T-460-R, AD-649532
Transl. Into English From the Book "nastoyashcheye I Proshloye Magnitnogo Polia Zemli" Moscow, "nauka" Press, 1965 P 206-213, From Geol. I Geofiz., Akad. Nauk Sssr, Sibirsk, Otd. (Novosibirsk), V. 1, 1966 P 94-101

Descriptors: *Dipole moment, *Geomagnetic field, *History, *U.S.S.R., Dipole, Field, Geomagnetic, Moment, Paleomagnetism, Periodic, Platform, Rock, Siberia, Stratigraphy, Variation.

For abstract, see STAR 05 15.
N67-28567 HC$3.00 MF$0.65

MAGNETIC DISTURBANCE IN THE REGION OF DRIFT OF STATION NORTH POLE 8.
Defence Research Board, Ottawa (Ontario). Directorate of Scientific Information Serivces.
N. A. Miliayev. Dec 66, 10p T-468-R, TT-67-60973
Transl. Into English From Problemy Arktiki I Antarktiki (Leningrad), Issue 21, 1965 P 72-80

Descriptors: *Drift, *Magnetic storm, *Polar region, Bering sea, Disturbance, Magnetic, Measurement, Periodic, Polar, Region, Storm, Sunspot, Table, U.S.S.R., Variation.

For abstract, see STAR 05 15.
N67-28622 HC$3.00 MF$0.65

THE ROLE OF THE MAIN GEOMAGNETIC FIELD IN LOCATING CONJUGATE POINTS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. C. Cain. Jun 67, 13p NASA-TM-X-55801, X-612-67-275
Prepared At the Conjugate Point Symp., Boulder, Colo., 15 Jun. 1967

Descriptors: *Conjugated system, *Geomagnetic field, *Mathematical model, Accuracy, Bibliography, Boundary, Calculation, Conjugate, Distortion, Epoch, Field, Geomagnetic, Intensity, Interaction, Location, Model, Plasma, Point, System.

For abstract, see STAR 05 15.
N67-28750 HC$3.00 MF$0.65

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. COMPONENTS

A SWITCHING CIRCULATOR: S-BAND; STRIPLINE; REMANENT; 15 KILOWATTS; 10 MICROSECONDS; TEMPERATURE-STABLE,
Massachusetts Inst of Tech Lexington Lincoln Lab
Foster Betts, Donald H. Temme, and Jerald A. Weiss. Jul 66, 6p Rept no. MS-1572
ESD-TR-67-185
Contract AF 19(628)-5167, ARPA Order-498
Prepared in cooperation with Worcester Polytechnic Inst., Mass.
Availability: Published in IEEE Transactions on Microwave Theory and Techniques vMTT-14 n12 p665-9 Dec 1966.

Descriptors: (*Waveguide circulators, Switching circuits), S band, Microwave equipment, Electronic switches, Ferromagnetic materials, Hysteresis.

A stripline, three-port remanence circulator switch was designed for high-speed switching of time delay in a phased array radar at S-band (2.9 GHz). Special attention was devoted to minimizing switching time and energy through design of the magnetic circuit and suppression of eddy currents. Temperature stabilization of insertion phase was accompished by means of a flux regulating magnetic circuit. Switching performance: time: less than 10 microseconds; energy: 450 microjoules. Circulator performance: bandwidth for >26 dB isolation, 8.9 percent; insertion loss, 0.35 dB. Temperature stability of insertion phase: one electrical degree per 10C. Peak RF power: 15 kW. The discussion includes details of the junction design and performance, techniques of eddy current suppression, temperature stabilization, and the method of switching energy measurements. (Author)
AD-653 499 Not available from CFSTI.

PERFORMANCE OF A RING CIRCULATOR DESIGNED BY A SYNTHESIS TECHNIQUE,
Massachusetts Inst of Tech Lexington Lincoln Lab
Samuel D. Ewing, Jr., and Jerald A. Weiss. 1 Jul 66, 3p Rept no. MS-1573A
ESD-TR-67-186
Contract AF 19(628)-5167, ARPA Order-498
Prepared in cooperation with Worcester Polytechnic Inst., Mass.
Availability: Published in NEREM Record p94-5 1966.

Descriptors: (*Waveguide circulators, *Strip transmission lines), (*S band, *Radiofrequency power), Microwave networks, Synthesis, Ferrites, Performance (Engineering), Design, Broadband, Phase shifters.

Theory and experimental results on a compact, symmetrical stripline, three-port, S-band ring circulator are briefly presented. The comparison shows that ring circulators can be successfully designed on the basis of a network model. It is pointed out that the design principle offers good prospects for broadband, high-power, and fast-switching designs.
AD-653 500 Not available from CFSTI.

DEVELOPMENT OF SEMICONDUCTOR DEVICES,
Foreign Technology Div Wright-Patterson AFB Ohio
Hsi-teh Hsieh. 25 Jan 67, 13p Rept no. FTD-TT-65-1066
TT-67-62100
Edited trans. of Tien Tzu Chi Shu (Chinese People's Republic), n4 p1-3 1964.

Descriptors: (*Semiconductor devices, *Transistors), Silicon, Frequency, Germanium, Triodes, Capacitance, Lasers, Industries, Gallium Arsenides, Microphotography, Boron, Isotopes, Theory, Indium, Tests, China.

Rapid progresses are made in the development of semiconductor devices such as transistors and semiconductor solid circuits. Germanium triodes having a cutoff frequency as high as 4200 mc/sec and silicon transistors having an operating frequency of 500 mc/sec and an output power of 1.5 w have been developed. New techniques used in semiconductor device production are: isotope techniques for analyzing the impurity contents in germanium, silicon, and other semiconductor materials; optical engraving process and microphotography for multiple circuit printing and geometric projection; filming process in the production of flat silicon triodes, capacitors, and resistors having a diffused antimonial base and a boron emitter. Semiconductor lasers having a gallium arsenide diode or an indium arsenide diode developed in recent years are based on the fundamental theories of physics. Author concludes that the applications of semiconductor devices must be extended to different industries and new processes must be developed to facilitate semiconductor device production. (Author)
AD-653 512 HC$3.00 MF$0.65

A CATHODE RAY TUBE DISPLAY,
Illinois Univ Urbana Coordinated Science Lab
Jack Stifle. Jun 67, 40p Rept no. R-357
Contract DA-28-043-AMC-00073 (E)

Descriptors: (*Cathode ray tubes, *Display systems), Programming (Computers), Digital computers, Cameras, Typewriters.

The report describes a cathode ray tube display unit designed for use as graphic output facility for a digital computer. The display features a self contained character generator, line generator, photographic unit, and a light pen. Data may be displayed in up to seven different modes. The maximum plotting rate is approximately 333,000 points/sec. (Author)
AD-653 525 HC$3.00 MF$0.65

TUNNEL DIODE,
Foreign Technology Div Wright-Patterson AFB Ohio
L. A. Logunov. 23 Jan 67, 6p Rept no. FTD-HT-66-700
Tunnelnyi Diod. Unedited rough draft trans. of Patent (USSR) 171 923, appl. 890062/26-25, 25 Mar 64.

Descriptors: (*Tunnel diodes, Manufacturing methods), Diodes (Semiconductor), Germanium, USSR, Inductance, Capacitance, Mechanical properties.

The mesa structure of the proposed germanium-base tunnel diode is mounted on a multilayer metal-germanium-glass structure. To decrease the

capacitance and inductance and to improve the mechanical stability of the mesa structure, the diode contains an annular germanium plate with an ohmic ring contact on one side, and a metallic plate soldered on the other side through a glass ring gasket. The alloy forming the p-n junction makes contact with the metallic plate and is located inside the germanium ring.
AD-653 527 HC$3.00 MF$0.65

COMPONENT EVALUATION DURING SHOCK,
Harry Diamond Labs Washington D C
For primary bibliographic entry see Field 14B.
AD-653 533 HC$3.00 MF$0.65

HALL EFFECT IN CHANNEL WITH SECTIONALIZED ELECTRODES,
Foreign Technology Div Wright-Patterson AFB Ohio
I. M. Tolmach, and N. N. Yasnitskaya. 28 Mar 67, 29p Rept no. FTD-MT-66-49
TT-67-62119
Effekt Kholla v Kanale s Sektsionirovannymi Elektrodami, edited machine trans. of Akademiya Nauk SSSR. Izvestiya. Energetika i Transport, n5 p91-104 1965.

Descriptors: (*Hall effect, *Electrodes), Electric currents, Density, Plasma physics, Electric insulation, Power, Efficiency, Voltage, Mathematical analysis, USSR.

The authors found distribution of current density during flow of electrically conductive liquid in channel with arbitrary number of sectionalized electrodes of finite dimensions (Hilbert boundary value problem for a band). For a very large number of electrodes the problem may be considered periodic. For this case the authors obtained distribution of current density through doubly periodic functions. Formulas were given for arbitrary constants entering in solution and depending on circuit of connection of electrodes. Dependences of efficiency, useful power, and voltage due to ratio of width of flow to pitch of section were plotted. (Author)
AD-653 542 HC$3.00 MF$0.65

METHOD OF OBTAINING MICROELECTRONIC DIODE MATRIX AND BAND-PASS STRUCTURES,
Foreign Technology Div Wright-Patterson AFB Ohio
V. I. Savchenko, and S. L. Sidorenko. 23 Feb 67, 6p Rept no. FTD-HT-66-716
Spsob Polucheniya Mikroelektronnykh Diodnykh Matrichnykh i Polosovykh Struktur unedited rough draft trans. of Patent (USSR) 168 519, appl. 819016/26-24, 14 Feb 63.

Descriptors: (*Microminiaturization (Electronics), *Diodes), Germanium, Electrolytic polishing, Hydrogen, Copper, Electrochemistry, Density, Abrasives, Sodium compounds, Hydroxides, USSR.

The production of matric es is simplified and the insulation of blank interse tions increased. A germanium plate is subjectec to diffusion by Sb vapour in hydrogen at 850C. One of the n layers of the n-p-n structure is removed by electrochemical polishing. The plate is then lined electrolytically with mutually-perpendicular grooves 0.05 mm deep, 0.1-0.15 mm wide with a spacing of 1.4 mm and ground with abrasive powder. A 50 micron copper coating is deposited electrolytically, a polystyrene rectangular network of buses with swellings corresponding to diodes is then superposed and the copper dissolved chemically from the uncovered places. Finally germanium is etched out electrochemically in a 10% solution of NaOH until the p-n germanium bars remain only at intersections. The density of diodes in a matrix amounts to 1200-1400 per 1 cu cm. 14.2.63 as 819016/26-24. (Author)
AD-653 552 HC$3.00 MF$0.65

RESEARCH ON DISTRIBUTED FERRITES FOR CROSSED-FIELD MICROWAVE DEVICES.
Quarterly rept. no. 3, 10 Aug-9 Nov 66,
Raytheon Co Waltham Mass Microwave and Power Tube Div
William A. Smith, Daniel Masse, John M. Osepchuk, Robert Plumridge, and Lawrence Tisdale. Jan 67, 43p Rept no. PT-1282
ECOM-02032-3
Contract DA-28-043-AMC-02032 (E), ARPA Order-679

Descriptors: (*Ferrites, *Crossed field devices), Microwave amplifiers, Delay lines, Oscillators, Dielectric properties, Waveguides, Backward-wave amplifiers, Thermal conductivity, Bonding, Tables, Nickel, Copper, Glass, Tests.

The objective of this program is to develop the knowledge and technology necessary to take full advantage of the unidirectional attenuative properties of ferrites in achieving improved gain and bandwidth in crossed-field microwave amplifiers and oscillators. During the third quarterly period, activities included cold testing of ferrite materials in conjunction with an L-band helix, and an investigation of narrow linewidth ferrites in an S-band Amplitron. Theoretical and Experimental studies have indicated that broadbanding of ferrites in a CFA can be accomplished by broader linewidths, porous ferrites, or by a combination of both methods. Measurements made on a porous magnesium ferrite support this conclusion. Bonding of ferrites to dielectric can be effected by the use of glass frit, and bonding to copper can be accomplished by sputtering nickel onto the ferrite in an argon atmosphere and subsequently brazing with silfos solder. (Author)
AD-653 638 HC$3.00 MF$0.65

ANALYSIS OF AN APERTURE ANTENNA SYSTEM LOADED WITH AN INHOMOGENEOUS DIELECTRIC.
Technical rept.,
Michigan Univ Ann Arbor Cooley Electronics Lab
J. Samuel Bitler. May 67, 133p Rept no. 7695-12-T, TR-180
ECOM-01870-180
Contract DA-28-043-AMC-01870 (E)

Descriptors: (*Antenna apertures, *Waveguides), (*Mathematical analysis, *Partial differential equations), Dielectric properties, Electric fields, Integrals, Reflection, Numerical analysis, Computers, Permeability, Accuracy, Green's function, Tables.

An analysis is made of an aperture system loaded with an inhomogeneous dielectric. The system consists of two parts. The first part is a section of rectangular waveguide extending from negative infinity along the z-axis to a distance z0 back from an infinite, perfectly conducting ground plane, whose normal is also in the z direction. This section of waveguide is filled with a homogeneous dielectric. The second part is a section of rectangular waveguide of the same dimensions extending from z0 to an aperture in the ground plane. This section of waveguide is filled with an inhomogeneous dielectric. The dielectric is characterized by a permeability and permittivity that varies exponentially with distance from the aperture. At first the waveguide containing the inhomogeneous dielectric was considered to extend to negative infinity. A set of modes was found to satisfy Maxwell's equations and the required aperture symmetries when the field incident at the aperture was a conventional TE10 mode. The fields on the free-space side of the aperture were written in integral form using the free-space Green's Function as a kernel and the aperture electric field as its source. (Author)
AD-653 642 HC$3.00 MF$0.65

NOISE MEASUREMENTS AS A TOOL IN ELECTRON DEVICE RESEARCH.
Tri-annual technical rept. no. 3, 1 Oct 66-31 Jan 67,
Minnesota Univ Minneapolis Electron Tube Research Lab
A. van der Ziel. May 67, 41p
ECOM-01880-3
Contract DA-28-043-AMC-01880 (E)

Descriptors: (*Noise, *Measurement), (*Electron multipliers, Noise), Image intensifiers (Electronics), Vidicons, Channel selectors, High frequency, Scanning, Electron tubes, Time, Amplifiers, Secondary emission, Television equipment, Illumination, Photocathodes, Theory, Iconoscopes, Signal-to-noise ratio, Tests.

The paper contains a study of noise in secondary electron conduction vidicons and in channel multipliers. In image intensifiers the noise is somewhat larger than the amplified shot noise of the primary current and drops to full shot noise of the amplified current at high frequencies. More noise measurements are reported in transmission secondary electron multipliers. At high gains the output becomes noisy, and the noise consists of spikes in the output current; this is attributed to breakdown in the KCl layer. A theoretical interpretation of the observations is given. A detailed study is made of noise in television pick-up devices. The cases discussed are: uniform illumination, single picture is illuminated, electron picture is scanned over an aperture, long integration time and short sweep time devices with multiplication between photocathode and target. (Author)
AD-653 653 HC$3.00 MF$0.65

A REALIZABILITY THEORY FOR SMOOTH LOSSLESS TRANSMISSION LINES.
Revised ed.,
Grumman Aircraft Engineering Corp Bethpage N Y Research Dept
M. R. Wohlers. 19 Jul 66, 10p
AFOSR-67-1317
Contract AF 49 (638)-1512
Revision of manuscript submitted 23 Mar 66.
Availability: Published in IEEE Transactions on Circuit Theory vCT13 n4 p356-63 Dec 1966.

Descriptors: (*Transmission lines, Theory), Differential equations, Scattering, Electrical impedance.

The paper concerns the terminal behavior of nonuniform lossless transmission lines of finite length, specifically, the properties of the scattering parameters of such lines. These parameters, normalized to passive source and load impedances, are expressed in terms of solutions to an integral equation in which the electrical length and the local characteristic impedance of the line are the independent parameters. It is shown that the input reflection factor (S sub 11 with the normalization used) of a smooth line of known electrical length, terminated in a known passive load, uniquely determines the local characteristic impedance and the remaining three scattering parameters of the line. A formal realizability theory is obtained in terms of the input reflection factor with resistive termination. The technique underlying this theory involves the reduction of the problem to the inversion of a Sturm-Liouville equation; a classic problem for which a well developed theory is available. This latter theory also suggests a possible synthesis procedure. (Author)
AD-653 700 Not available from CFSTI.

THE EVALUATION OF RHENIUM RESISTORS.
Phase rept.,
Naval Air Development Center Johnsville Pa Aeronautical Photographic Experimental Lab
John F. Jones, and K. Gentner. 26 Apr 67, 28p
Rept no. NADC-AE-6711

Descriptors: (*Resistors, Rhenium), (*Microminiaturization (Electronics), Resistors), Resistance

(Electrical), Manufacturing methods, Films, Vacuum apparatus, Vapor plating, Tests.
Identifiers: Evaluation.

Efforts leading to the development of sequential component deposition for process evaluation of rhenium resistors are reported. Preliminary results of component testing are discussed and are used to demonstrate the need for the new approach. (Author)
AD-653 715 HC$3.00 MF$0.65

MAGNETIC COMPRESSION OF ELECTRON BEAMS.
Quarterly rept. no. 7, 1 Jan-31 Mar 67,
Hughes Research Labs Malibu Calif
Kurt Amboss. Jun 67, 43p
ECOM-01463-7
Contract DA-28-043-AMC-01463 (E)
See also AD-652 278.

Descriptors: (*Electron beams, Magnetic fields), Electron guns, Compressive properties, Focusing, Density, Distribution functions.

The objective of this program is to compress a perveance 0.54 x 10 to the -6th power A/V raised to the 3/2 power electron beam by a factor of 1000 and to gain an understanding of the behavior of the compressed beam. Magnetic compression has been demonstrated with a short field buildup provided by a simple pole-piece. If a similar result can be achieved with a much denser beam, magnetic compression will provide an attractive method of obtaining beams of the required size. Highly compressed beams with moderate amounts of space charge take on an almost gaussian appearance after compression; this can be explained by assuming that the transverse energy is primarily in rotation. The beam has an effective transverse temperature TB given by TB = TcAc where Tc is the cathode temperature and Ac is the area compression of the beam.
AD-653 793 HC$3.00 MF$0.65

RADIATION EFFECTS ON ELECTRONIC PARTS AND MATERIALS.
Quarterly rept. no. 3, 15 Dec 66-14 Mar 67,
IBM Electronics Systems Center Owego N Y
Frank A. Frankovsky. May 67, 29p Rept no. IBM-67-521-3
ECOM-02374-3
Contract DA-28-043-AMC-0237
See also AD-645 765.

Descriptors: (*Electronic equipment, *Radiation damage), Dielectrics, Capacitors, Mica, Polyester plastics, Styrene plastics, Tests.

Results of mica and polystyrene capacitor irradiations at an Advanced Flash X-Ray source are presented in this quarterly report. Expressions have been developed for analyzing the conductivity effect as a result of the ionizing radiation from X-rays of 5-MeV energy at pulse durations of 30 to 100 nanoseconds. Characteristic parameters derived from these expressions are discussed in this report. These parameters show a good consistency over different variations of voltage, dose, and temperature. (Author)
AD-653 795 HC$3.00 MF$0.65

HIGH RELIABILITY CONNECTIVE DEVICES.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 11H.
AD-653 847 HC$3.00 MF$0.65

NOVEL IMAGE-DISSECTOR CAMERA-TUBE FOR SURVEILLANCE APPLICATION INVESTIGATION.
Westinghouse Electric Corp Elmira N Y Electronic Tube Div
For primary bibliographic entry see Field 6E.
AD-653 855 HC$3.00 MF$0.65

HETEROJUNCTION DEVICES.
Syracuse Univ Research Inst N Y
For primary bibliographic entry see Field 20L.
AD-654 001 HC$3.00 MF$0.65

3.2 MILLIMETER WAVE OSCILLATOR.
Hughes Research Labs Malibu Calif
For primary bibliographic entry see Field 9E.
AD-654 032 HC$3.00 MF$0.65

POLYMER FILMS LOADED WITH INORGANIC AND ORGANIC MATERIALS FOR USE AS CAPACITOR DIELECTRICS.
Technical rept.,
Army Electronics Command Fort Monmouth N J
Wayne R. Wenger. Feb 67, 27p Rept no. ECOM-2809

Descriptors: (*Dielectric films, Polymers), Capacitors, Barium compounds, Titanates, Organic compounds, Additives, Dielectric properties, Plastics.

Methods and procedures of preparing suspensions and solutions of polycarbonate and polysulfone polymers and of loading these with barium titanate or selected organic compounds to form films of 0.1 to 4.5 mils thickness have been developed. The dielectric data reported include dielectric constants ranging from 5 to 400, dissipation factors of .0060 to .030, and voltage breakdown of 200 to 5400 V/mil. Of the films loaded with inorganic material, one containing 70% (by weight) of barium titanate appears to have the optimum dielectric properties. The maximum loading of the organic compounds was about 10% (by weight). The data reported indicate that these films have a potential application in miniaturized circuits. (Author)
AD-654 132 HC$3.00 MF$0.65

METAL-VANADIUM PENTOXIDE-SILICON DIODES WITH HIGHLY VARIABLE CAPACITANCES.
Technical rept.,
Army Electronics Command Fort Monmouth N J
Charles McAfee. Apr 67, 24p Rept no. ECOM-2815

Descriptors: (*Diodes (Semiconductor), Capacitance), Metals, Vanadium compounds, Oxides, Silicon, Manufacturing methods, Varactor diodes.

Large-area metal-metal oxide-semiconductor diodes (top contact diameter = 1.6 mm) have been fabricated by evaporating vanadium pentoxide, V_2O_5, on carefully prepared surfaces of 12-ohm-cm n-type silicon wafers, firing at 700C, evaporating nickel for contact to the oxide, and chemically depositing nickel on the sub-surface of the silicon wafer to achieve ohmic contact to the silicon. Reverse breakdown of the diodes was 80 volts or higher, varying with oxide thickness and care in surface preparation. Capacitance variation with frequency at zero bias was determined over the range 15 kHz - 5 MHz. The data showed a decrease in capacitance with frequency from 2.750 nF at 15 kHz to 0.250 nF at 5 MHz. Capacitance variations with bias for various frequencies over the range 100 kHz - 5 MHz were also determined. For the frequency range, 100 kHz - 2 MHz, capacitance increased with forward bias, attained a maximum value in the interval 0.3 to 1.5 volts above zero bias, and decreased thereafter with increased forward bias. Each peak capacitance value occurred at successively lower forward bias values as frequency increased. Capacitance ratios greater than 60:1 were obtained for the frequency range 100 kHz through 1 MHz with more than 60% of the change occurring within the interval 0.4 to 0.6 volts reverse bias. (Author)
AD-654 133 HC$3.00 MF$0.65

GENERALIZED MODEL FOR SEMICONDUCTOR RADIATION RESPONSE PREDICTION.
Final rept. no. 8, 15 Dec 64-14 Mar 67,
Nortronics Newbury Park Calif Applied Research Dept
James P. Raymond, and Robert E. Johnson. Jun 67, 170p Rept no. NARD-67-21R
ECOM-00423-F
Contract DA-28-043-AMC-00423 (E)

Descriptors: (*Semiconductor devices, *Radiation damage), Semiconductors, Mathematical models, Transients, Mathematical prediction, Diodes (Semiconductor), Transistors, Integrated circuits.

The lumped model technique of representing semiconductor device response to radiation was applied to diodes, bipolar transistors and integrated circuit elements. The lumped model formalism was first developed by approximating the equations governing electron and hole flow in a semiconductor, and the feasibility of the technique was established by the representation of diodes and transistors. The analysis was then extended to the detailed large-signal response and saturated storage time of the bipolar transistor and monolithic transistor element, and the general form of the monolithic diffused resistor element. With the use of computer aids, the electrical and radiation response of these devices was calculated solely from electrical and geometrical parameters. The lumped model technique has been established as an accurate, practical, and straight-forward method of deriving the mathematical model for a semiconductor device, calculating the electrical and ionizing radiation-induced transient response, and predicting the parameter degradation of displacement damage. Representation of the discrete bipolar transistor, and the bipolar transistor and resistor junction-isolated monolithic integrated circuit elements establish the necessary basis for the analysis of integrated circuits. (Author)
AD-654 134 HC$3.00 MF$0.65

DETERMINATION OF CRITERIA FOR HIGH DENSITY CIRCULAR connector and selection of amphenol astro/348 DESIGN AS ARMED SERVICE STANDARD.
Final rept.,
Naval Air Development Center Johnsville Pa
Aero-Electronic Technology Dept
W. Ritchie, and G. Kalen. 14 Jun 67, 32p Rept no. NADC-AE-6722

Descriptors: (*Electric connectors, Military requirements), Standards, Performance (Engineering), Density.

The criteria for high density, circular, electric connectors was developed based upon the requirements of the armed services. Commercially available high-density connectors from 7 manufacturers were evaluated and the Amphenol ASTRO/348 connector was selected as the standard for the services. A procurement specification and its attendant drawings, covering the requirements was prepared. (Author)
AD-654 171 HC$3.00 MF$0.65

THE REQUIREMENTS PLACED ON ELECTRON TUBES FOR SPACE APPLICATIONS.
National Aeronautics and Space Administration. Electronics Research Center, Cambridge, Mass.
W. H. Kohl, C. M. Veronda, and R. W. Wilmarth.
Jan 67, 12p NASA-TN-D-3733
Contract 125-22-03-12
Presented At the 8th Natl. Conf. on Tube Techniques, New York, 20-22 Sep. 1966

Descriptors: *Component reliability, *Electron tube, *Space environment, *Weight factor, Component, Cooling, Effect, Electron, Environment, Factor, Field, Gravity, Magnetic, Microwave, Radiation, Reliability, Requirement, Shock, Space, Temperature, Tube, Vibration, Weight.

For abstract, see STAR 05 15.
N67-28751 HC$3.00 MF$0.65

9B. COMPUTERS

COMPUTING, THINKING, AND DYNAMICS,
Naval Ordnance Lab White Oak Md
W. R. Thickstun. 19 Dec 66, 36p Rept no. NOLTR-67-54, Mathematics Dept-M-68

Descriptors: (*Computers, Mathematical models), (*Bionics, Theory), Information theory, Reasoning, Dynamics, Numerical methods and procedures, Algorithms.

A heuristic discussion is presented of the general problem of computing as it in fact is usually performed. The discussion has important implications for the process of constructing mathematical models. (Author)
AD-653 446 HC$3.00 MF$0.65

THE INPUT/OUTPUT AND CONTROL SYSTEM OF THE MOORE SCHOOL PROBLEM SOLVING FACILITY.
Technical rept.,
Pennsylvania Univ Philadelphia Moore School of Electrical Engineering
Richard P. Morton, and Michael S. Wolfberg. Jun 67, 150p Rept no. 67-30
Contract Nonr-551 (40)

Descriptors: (*Teletype systems, *Input-output devices), (*Problem solving, Digital computers), Information retrieval, Real time, Interactions, Programming (Computers), Scheduling, Remote control systems, Management engineering, Computer programs, Coding, Instruction manuals, Documentation, Bibliographies, Graphics, Pictures, Processing.

The report documents the effort which has to date gone into providing the on-line, real-time capability needed for the Moore School problem solving facility. The facilities described allow a user at a remote terminal to prepare input, execute programs on a computer and examine his output. The programs described are responsible for controlling this process by transmitting and buffering the data to and from the computer, translating between external and internal codes, and scheduling the computers' efforts.
AD-653 465 HC$3.00 MF$0.65

SIMULTANEOUS MULTIPLE PARAMETER ADJUSTMENT IN ADAPTIVE SYSTEMS USING A SINGLE PERTURBATION SIGNAL.
Yale Univ New Haven Conn Dunham Lab
For primary bibliographic entry see Field 9E.
AD-653 474 HC$3.00 MF$0.65

A PROCEDURE FOR RANKING DIAGNOSTIC TEST INPUTS,
Illinois Univ Urbana Coordinated Science Lab
Theo J. Powell. May 67, 61p Rept no. R-354
Contract DA-28-043-AMC-00073 (E)

Descriptors: (*Digital computers, *Diagnosis), Computers, Tests, Probability, Combinatorial analysis, Failure (Electronics), Computer logic, Weight, Machine translation.

Contents: Package level diagnosis; Prime implicant diagnostic procedure; Probability weighting procedure; Assumed number of outputs; Example with probabilistic weights; Comparison; Probabilistic weight formula; Weight formula derivation; Multi-output example; Future work and conclusions; Sequential machine extension; Future research areas. (Author)
AD-653 523 HC$3.00 MF$0.65

SCIENTIFIC TECHNICAL CONFERENCE ON THE USE OF COMPUTER TECHNOLOGY IN THE FIELD OF ELECTRIC POWER ENGINEERING,
Foreign Technology Div Wright-Patterson AFB Ohio
A. A. Taits. 14 Mar 67, 19p Rept no. FTD-HT-66-759
TT-67-62126
Nauchno-Tekhnicheskaya Konferentsiya po Primeneniyu Vychislitelnoi Tekhniki v Elektroenergetike, edited trans. of Elektricheskie Stansii (USSR), n8 p87-90 1965.

Descriptors: (*Computers, *Symposia), Electric power production, Optimization, Scientific research, Engineering, Dynamics, Mathematical analysis, Power equipment, Economics, Power supplies, USSR.

The article discusses the developments of a technical conference on the use of computer technology in the field of electric power engineering held December 23-26, 1964 in Moscow. More than forty papers were presented by various organizations. It was noted that the use of computers in electric power engineering is one of the leading trends in scientific research in planning, designing, and organization of the exploitation in electric power engineering. At present regular calculations are being made of regimes of the Ukr SSR electric power system on the Ural-2 computer, daily schedules of the electric power demand in large power supply systems such as YeES (United Power System) of the European part of the USSR are being predicted, computer calculations are being made of the optimal distribution of active loads between electric power stations and systems, and calculations are being made of the optimal positioning of compensating devices in power supply systems. The importance was noted of using results of scientific research in cybernetics for solving problems on the optimization of the development and control of power systems using computer technology. The conference noted a need to create an all-union library of typical programs for standard computers. (Author)
AD-653 540 HC$3.00 MF$0.65

APPLICATION OF ORTHOGONAL FILTERS FOR OPTIMIZATION AND INVESTIGATION OF STATISTICAL PROPERTIES OF ERRORS OF SELF-ADJUSTING SYSTEMS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 12A.
AD-653 560 HC$3.00 MF$0.65

RESEARCH ON STRIPE DOMAIN STRUCTURES IN FERROMAGNETIC METAL FILMS.
Franklin Inst Research Labs Philadelphia Pa
For primary bibliographic entry see Field 11G.
AD-653 601 HC$3.00 MF$0.65

DYNAMIC ADAPTIVE DATA BASE MANAGEMENT STUDY.
Texas Univ Austin Linguistics Research Center
For primary bibliographic entry see Field 5B.
AD-653 640 HC$3.00 MF$0.65

HEXADECIMAL PRONOUNCED CORRECTLY.
Technical paper,
Research Analysis Corp Mclean Va
Robert A. Magnuson. Feb 67, 33p Rept no. RAC-TP-253
Contract DA-44-188-ARO-1

Descriptors: (*Numbers, Computers), (*Coding, Programming (Computers)), Digital computers, Data processing systems, Input-output devices, Algorithms, Errors.
Identifiers: IBM 360, Computer software, Hexadecimal.

The paper identifies and solves three problems that arise because the System/360 Software used hexadecimal numeration. The principal contribution of the paper is the complete system of pronunciation for hexadecimal numbers. The paper also explains clearly why a system like hexadecimal needs to be used. (Author)
AD-653 647 HC$3.00 MF$0.65

FAILURE-ERASURE CIRCUITRY: A DUPLICATIVE TECHNIQUE OF FAILURE-MASKING SYSTEMS.
Revised ed.,
Massachusetts Inst of Tech Lexington Lincoln Lab
John B. Connolly, and William G. Schmidt. 17 Oct 66, 5p Rept no. JA-2808
ESD-TR-67-250
Contract AF 19 (628)-5167
Revision of manuscript submitted 24 May 66.
Availability: Published in IEEE Transactions on Electronic Computers vEC-16 n1 p82-5 Feb 1967.

Descriptors: (*Logic circuits, Redundant components), Reliability (Electronics), Digital systems, Programming (Computers).

The paper describes a logical redundancy technique based on failure-erasure circuitry that is capable of automatically masking as many as P−1 individual failures in P identical elements connected in parallel. This technique is contrasted with the standard von Neumann scheme where only (P/2) such failures can be tolerated. In order to prevent the effect of any single failure from propagating, each logical element in the original network need only be duplicated rather than triplicated as in the von Neumann technique. The usefulness of the redundancy technique described is predicated on the existence of circuitry that fails to a NULL state rather than to a ZERO or ONE state. Accordingly, several circuits which exhibit the desired failure mode and that ware worthy of further development for reliability applications are discussed. (Author)
AD-653 674 Not available from CFSTI.

ADDITIONAL FACILITIES AVAILABLE WITH R.A.E. PROGRAM 187/A FOR USE IN SUPPLEMENTING SPARSE OR UNEVEN DATA.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
Margaret J. Trigwell. Oct 66, 19p Rept no. RAE-TR-67005

Descriptors: (*Data, *Magnetic tape), Data processing systems, Computers, Machine tools, Operation, Tables, Accuracy.

The Report describes two extra facilities which are now available with R.A.E. program 187/A (used in connection with machine tool control). Their purpose is to introduce supplementary data when the original data is sparse or uneven and so to give more satisfactory results when models are cut with numerically controlled machine tools. (Author)
AD-653 693 HC$3.00 MF$0.65

STABILITY OF PREDICTIVE CONTROL SYSTEMS.
Revised ed.,
Rensselaer Polytechnic Inst Troy N Y Dept of Electrical Engineering
H. Kaufman. 11 Apr 66, 12p
AFOSR-67-1339
Grant AF-AFOSR-279-63
Doctoral thesis. Revision of manuscript submitted 8 Nov 65.
Availability: Published in IEEE Transactions on Automatic Control vAC11 n3 p455-64 Jul 1966.

Descriptors: (*Control systems, Automation), Stability, Predictions, Servomechanisms, Transfer functions.

The use of a low-order model to determine the approximate time-optimal switching function for a given plant has been experimentally investigated. This paper utilizes Liapunov's second method to determine asymptotic stability in the large or, in some cases, boundedness of the states of these predictive or quasi-time-optimal control systems. The basic model transfer function is K/s (Ts+1) (K,T>O), since previous results indicated its versatility for controlling plants of various forms. Plants considered are second-order, both linear and nonlinear, and higher order linear plants. Results show that systems with stable, controllable second-order plants will be asymptotically stable in the large, and systems with linear controllable high-order plants with no more than two free integrations will have ultimately bounded error and error rate. Examples are presented to illustrate the results. (Author)
AD-653 708 Not available from CFSTI.

DARE SUPPORT PACKAGE,
Naval Ordnance Lab White Oak Md
Jane S. Hebbert, and Mary E. Beszterczei. 1 May 67, 86p Rept no. NOLTR-67-26

Descriptors: (*Computer programs, Data processing systems), (*Wind tunnels, Data processing systems), Experimental data, Subroutines, Special purpose computers, Aerodynamics, Supersonic wind tunnels, Hypersonic wind tunnels.
Identifiers: DARE programs.

The FORTRAN IV DARE Support Package is a set of programs used at the Naval Ordnance Laboratory to manage raw data tapes recorded from Supersonic Tunnel I or Hypersonic Tunnel 8 by EPSCO I or EPSCO II recording systems. The package is comprised of three sections for each tunnel: LISTER edits and lists the raw data; EDIT reads, edits and presents the raw data on tapes for further processing; STACKER stacks, verifies and lists raw data tapes. The report describes the usage and supplies the listings for the DARE Support Package. (Author)
AD-653 854 HC$3.00 MF$0.65

CRYOGENIC RESEARCH.
Final rept.,
TRW Systems Redondo Beach Calif
Horace T. Mann. Dec 66, 98p Rept no. 00003-6001-R000
Contract Nonr-2542 (00)

Descriptors: (*Cryogenics, *Computer storage devices), (*Thin film storage devices, Superconductivity), Films, Dielectric films, Manufacturing methods, Polymers, Masking, Tunneling (Electronics), Gates (Circuits).
Identifiers: Cryotrons.

Initial work on the Persistor soon required thin film technology which was considerably beyond the state-of-the-art at that time. Consequently a major fraction of effort was then, and continued to be, devoted to the understanding of the properties of thin films and their methods of fabrication. Somewhat later it became apparent that a crossed-film cryotron could serve both as a logical element and as a memory storage element. Work on the Persistor was discontinued at that time. Another of the major technological problems both here and elsewhere was the difficulty in forming suitable dielectric films. To overcome this problem a dielectric film was developed which employed an electron beam to polymerize a slowly condensing siloxane vapor in vacuum. This proved far superior to the more conventional silicon monoxide technology. The limitations imposed by an essentially two-dimensional logic led to extensive studies of component interconnection in two dimensions. From this came the concept of an associative memory in which logic is deposited without the memory itself. This memory has the additional feature that it can be interrogated based on its contents rather than by use of an assigned address. Later work was devoted towards successful fabrication of a 900-cryotron array which was to form the basis for a small, prototype associative memory. 900-cryotron arrays were fabricated successfully with all of the cryotrons functional, but the difficulties encountered in the use and handling of large area masks ultimately prevented successful production of an associative memory array. (Author)
AD-653 884 HC$3.00 MF$0.65

SOVIET CYBERNETICS: RECENT NEWS ITEMS NO. 5,
Rand Corp Santa Monica Calif
Wade B. Holland. Jun 67, 102p Rept no. P-3600/5
TT-67-62138
See also AD-650 944.

Descriptors: (*Computers, USSR), (*Cybernetics, USSR), Data processing systems, Quality control, Production control, Analog computers, Automation, Digital computers, Technical information centers, Reviews.

Content: Systems at > one billion opns/sec: outline of a new direction for Soviet computer development; Minsk-222; The M-220: description and photograph; Gvishiani discusses management science and systems analysis; Rednev interviewed on university-industry cooperation; Mathematicians propose sabbaticals, foreign exchanges; Ob' data transmission system; More emphasis needed on scientific data processing; Computer malfunction diagnostics; Organization of computer production criticized; photo of VNIIEM-3; Soviet science in the Ukraine: historical survey; More on the Vil'nyus calculator controversy; Cybernetics in transcaucasia: survey; Articles and photographs in the Soviet press, May 1967.
AD-653 937 HC$3.00 MF$0.65

A UNIVERSAL PROGRAMMING LANGUAGE (ALGOL 60),
Foreign Technology Div Wright-Patterson AFB Ohio
S. S. Lavrov. 23 Mar 67, 180p Rept no. FTD-HT-66-382
TT-67-62148
Unedited rough draft trans. of mono. Universalnyi Yazyk Programmirovaniya (ALGOL 60), Moscow, 1964 171p.

Descriptors: (*Programming languages, Textbooks), Coding, Symbols, Algorithms, Computers, Mathematics.
Identifiers: Algol.

This book is a manual for the study of the international algorithmic language ALGOL 60 intended for the complete and concise description of computation processes by means similar to the conventional mathematical symbolism. The language is an important auxiliary for electronic computers. The book is intended for engineers, who have to deal with calculations on electronic computers in their work without being specially trained in this. (Author)
AD-653 964 HC$3.00 MF$0.65

CLASSIFICATION AND ENUMERATION OF AUTONOMOUS SEQUENTIAL MACHINES.
Technical rept.,
Illinois Univ Urbana Engineering Experiment Station
Hollis Franklin Ryan. Jun 67, 138p Rept no. TR-12
AFOSR-67-1412
Contract AF 33 (615)-3890, Grant AF-AFOSR-7-67
Sponsored by Grant PHS-GM-10718-03.

Descriptors: (*Automata, Classification), Graphics, Counting methods, Numbers, Topology.
Identifiers: Sequential machines.

A study is reported of the structure of the state transition graphs of autonomous sequential machines. (An autonomous sequential machine can be viewed as an isolated, discrete information processing system). The structural properties of the graphs are formally described. A state transition graph is proved to have a unique partitioning into components. It is also proved that a component has a canonical partition into functional rooted trees, and a functional rooted tree can be decomposed into a forest of functional rooted trees. Using the structural properties of the state transition graphs, nested classification systems are defined for the set of autonomous sequential machines having labeled states and for the set of autonomous sequential machines having unlabeled states. All the enumeration problems associated with the classification systems are solved. Expressions are given for the number of connected labeled machines and the number of connected unlabeled machines. Solutions are also given for several counting problems of more general application. Recursive formulas were found for counting labeled and unlabeled rooted trees. The problem of finding the number of cyclic permutations with non-distinct elements is solved; a formula for calculating the coefficients of the Bell polynomials is given. Numerical results are tabulated for autonomous sequential machines having from one to five states. (Author)
AD-653 999 HC$3.00 MF$0.65

MANAGEMENT INFORMATION SYSTEM,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5A.
AD-654 011 HC$3.00 MF$0.65

APPLICATION OF THE KALMAN FILTER TO SEQUENTIAL OPTIMAL PARAMETER ESTIMATION VIA HOUSEHOLDER'S MATRIX INVERSION METHOD.
Army Test and Evaluation Command White Sands Missile Range N Mex Deputy for National Range Operations
For primary bibliographic entry see Field 12A.
AD-654 027 HC$3.00 MF$0.65

COMPATABILITY AND ROW-COLUMN MINIMIZATION OF SEQUENTIAL MACHINE,
Illinois Univ Urbana Coordinated Science Lab
Gerald J. Lipovski. May 67, 102p Rept no. R-355
Contract DA-28-043-AMC-00073 (E)

Descriptors: (*Automata, Compatibility), Algebras, Mapping (Transformations), Algorithms, Topology.
Identifiers: Sequential machines.

The abstract framework in which reduction of a sequential machine takes place is studied. The covering and closure conditions are derived from a conceptually simple notion of compatible total states and a Boolean algebra is explored which is used to transform these conditions into mappings that produce compatible machines. An algorithm based on a product-of-sums written in this algebra is presented. An algorithm based on a distributed sum-of-products in the same algebra is developed. This second algorithm appears simpler and more appealing. (Author)
AD-654 030 HC$3.00 MF$0.65

RELATIONSHIPS BETWEEN TROPICAL PRECIPITATION AND KINEMATIC CLOUD MODELS.
Travelers Research Center Inc Hartford Conn
For primary bibliographic entry see Field 4B.
AD-654 129 HC$3.00 MF$0.65

CIRCAL: ON-LINE CIRCUIT DESIGN.
Massachusetts Inst of Tech Cambridge Dept of Electrical Engineering
For primary bibliographic entry see Field 9E.
AD-654 139 Not available from CFSTI.

THE REALISATION OF PRACTICAL GENERAL PURPOSE COMPUTERS WITH THE MINIMUM OF HARDWARE.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
D. Stone. Nov 66, 83p Rept no. RAE-TR-66355

Descriptors: (*Digital computers, Design), Coding, Computer logic, Computer storage devices, Programming (Computers), Costs, Magnetic core storage, Problem solving.
Identifiers: Computer hardware.

A means of making low cost general purpose computers is described in this report. The technique employed makes use of a brief and elementary order code which does not include arithmetical instructions. When required, arithmetical operations can be performed by means of sequences of minimal instructions. The computing power of such a machine is shown to be greatly increased by the aid of a few special locations in the core store able to perform logical operations on quantities passed through them. (Author)
AD-654 143 HC$3.00 MF$0.65

MATRIX A FORCE CONSTANT ADJUSTER PROGRAM TO OBTAIN LEAST SQUARES FIT TO OBSERVED FREQUENCIES OF MOLECULES AND CRYSTALS,
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 13.
IN-1077 HC$3.00 MF$0.65

CROWBAR CODE.
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18A.
For abstract, see NSA 21 13.
LA-3548 HC$3.00 MF$0.65

TEN-BIT ANALOG-TO-DIGITAL CONVERTER.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
R. S. Lee. Jun 67, 10p NASA-TN-D-3666
Contract 879-10-03-01-51

Descriptors: *Analog-to-digital converter, *Logic circuit, Accuracy, Analog, Converter, Data, Digital, Electronics, Gate, Power, Processing, Quantum, Sampling.

For abstract, see STAR 05 15.
N67-28376 HC$3.00 MF$0.65

AN ALGOL PROCEDURE FOR THE SOLUTION OF LEAST SQUARES PROBLEMS WITH CONSTRAINTS.
Reactor Centrum Nederland, Petten.
H. M. Rietveld. Mar 67, 19p RCN-67

Descriptors: *Algol, *Least squares method, *Nonlinear system, Array, Computer, Constraint, Equation, Least, Linear, Matrix, Method, Nonlinear, Parameter, Problem, Program, Solution, Square, System.

For abstract, see STAR 05 15.
N67-28703 HC$3.00 MF$0.65

SPACE SYSTEMS ANALYSIS AND COMPUTER PROGRAMMING SERVICES QUARTERLY PROGRESS REPORT, 1 JAN. - 31 MAR. 1967.
International Business Machines Corp., Gaithersburg, Md. Scientific Satellite Systems Dept.
31 Mar 67, 195p NASA-CR-84797, QPR-3
Contract NAS5-10022

Descriptors: *Computer programming, *Ground support system, *Scientific satellite, Analysis, Applications technology satellite (ats), Biosatellite, Command, Computer, Control, Data, Ground, Launching, Nimbus satellite, Ogo, Orbit, Oso, Pogo, Processing, Programming, Reduction, Satellite, Science, Support, System, Telemetry, Tiros satellite.

For abstract, see STAR 05 15.
N67-28765 HC$3.00 MF$0.65

COMPUTATION OF APPROXIMATE FUEL-OPTIMAL CONTROL.
Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering.
For primary bibliographic entry see Field 22C.
For abstract, see STAR 05 15.
N67-28840 HC$3.00 MF$0.65

AN ON-LINE DISTRIBUTION ANALYZER AND FADE COUNTER FOR TIME VARYING SIGNALS.
Institutes for Environmental Research, Boulder, Colo.
For primary bibliographic entry see Field 9E.
PB-174 839 HC$3.00 MF$0.65

TEUTA KINEMATICAL ANALYSIS PROGRAM FOR COLLIDING BEAM EVENTS,
Stanford Linear Accelerator Center, Calif.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 13.
SLAC-72 HC$3.00 MF$0.65

PROCEDURE FOR INTERPOLATING BIVARIANT DATA INFLUENCED BY RANDOM ERROR,
California Univ., Livermore. Lawrence Radiation Lab.
J. H. Van Sant.31Mar 67, 12p
Contract W-7405-eng-48

Descriptors: (*Computer programs, *Interpolation), (*Probability, *Least squares method), symbols, Errors.

For abstract, see NSA 21 13.
UCRL-50219 HC$3.00 MF$0.65

9C. ELECTRONIC AND ELECTRICAL ENGINEERING

APPLIED RESEARCH IN THIN-FILM FIELD EMISSION TUBES.
Stanford Research Inst., Menlo Park, Calif.
For primary bibliographic entry see Field 20C.
AD-439 660 HC$3.00

THE CORRECTION OF HELIUM SPEECH DISTORTION.
HRB-Singer Inc State College Pa
For primary bibliographic entry see Field 17B.
AD-653 471 HC$3.00 MF$0.65

SENSITIVITY REDUCTION USING OPTIMALLY DERIVED CONTROLLERS,
Illinois Univ Urbana Coordinated Science Lab
James P. Herner. May 67, 43p Rept no. R-353
Contract DA-28-043-AMC-00073 (E)

Descriptors: (*Sensitivity, *Linear systems), Feedback, Design, Equations, Theory, Control systems, Automatic, Errors, Optimization, Invariance.

Feedback structures which reduce the parameter sensitivity of linear system are derived from the solution of the classical linear regulator problem. Linear, time varying systems with several inputs and outputs are treated, and simplifications in the design are noted for the time invariant case. Throughout the discussion, problems of implementation are considered as contraints on the design of the system. Specifically, unbounded elements in the controller are now allowable as the solution to be sensitivity problem. It is shown that for the structure, herein called Nth order feedback, the sensitivity of the system may be reduced to an arbitrarily small value. (Author)
AD-653 522 HC$3.00 MF$0.65

METHOD OF OBTAINING MICROELECTRONIC DIODE MATRIX AND BAND-PASS STRUCTURES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 9A.
AD-653 552 HC$3.00 MF$0.65

INITIAL VHF PROPAGATION RESULTS USING XELEDOP TECHNIQUES AND LOW ANTENNA HEIGHTS.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 17B.
AD-653 609 HC$3.00 MF$0.65

PSYCHOLOGICAL RESEARCH IN ELECTRONICS MAINTENANCE TRAINING,
George Washington Univ Alexandria Va Human Resources Research Office
For primary bibliographic entry see Field 5J.
AD-653 620 HC$3.00 MF$0.65

THE CLOSED LOOP CHARACTERISTICS OF AN AUTOMATIC DIRECT READOUT IMPEDANCE BRIDGE,
Pennsylvania State Univ University Park Ionosphere Research Lab
Joseph J. Ellis. 20 Mar 67, 175p Rept no. Scientific-293 (E)
AFCRL-67-0180
Contract AF 19 (628)-4050

Descriptors: (*Impedance bridges, *Automatic), Electrical impedance, Reading machines, Circuits, Amplifiers, Measurement, Accuracy, High frequency, Design, Inductance, Digital computers, Control, Transformers, Computer programs, Time, Errors.

The capabilities and limitations of an automatic complex impedance bridge were investigated. The bridge configuration selected as the most desirable for this effort is the inductively coupled ratio arms bridge. The operational characteristics of the bridge were studied in detail. In particular, relationships were developed relating the accuracy of the bridge measurements to the equivalent circuit of the bridge. The control mechanism for the balancing process was designed and simplified by exploiting the inherent characteristics of the bridge. A transformerless ratio arms bridge was proposed for high frequency applications where the inherent inductances of transformers might prove to be a factor limiting the accuracy of impedance measurements. The critical parameters of this bridge were also investigated in detail. (Author)
AD-654 012 HC$3.00 MF$0.65

SENSITIVITY ANALYSIS PROGRESS REPORT, 1 MAR. - 1 MAY 1967.
Missouri Univ., Columbia. Dept. of Electrical Engineering.
M. J. Devaney, W. W. Happ, and G. W. Zobrist.
1967, 12p NASA-CR-84818

Contract NGR-26-004-035
Presented At 10th Midwest Circuit Symp., Lafayette, Ind., 18-19 May 1967

Descriptors: *Electric network, *Flow graph, *Sensitivity, Activity, Algorithm, Circuit, Coding, Coefficient, Computer, Electric, Equivalent, Flow, Function, Graph, Network, Passive, Printout, Program, Topology.

For abstract, see STAR 05 15.
N67-28769 HC$3.00 MF$0.65

SIGNAL GENERATOR SG-31A/U.
Technical manual instrument calibration procedure AG-70.
Burroughs Corp., Paoli, Pa. Field Engineering and Support Div.
15 Apr 67, 25p
NAVAIR-17-20AG-70

Descriptors: (*Calibration, *Signal generators), Instruction manuals, Test equipment (Electronics), Test methods.

The procedure contains the information necessary for calibrating the SG-31A/U signal generator. (Author)
PB-174 852 HC$3.00 MF$0.65

FREQUENCY SELECTIVE VOLTMETER SIERRA 125.
Technical manual instrument calibration procedure, AE-47.
Lockheed Electronics Co., Clark, N. J.
15 Apr 67, 17p
NAVAIR-17-20AE-47
Contract N123 (62861)51296A

Descriptors: (*Calibration, *Voltmeters), Instruction manuals, Test equipment (Electronics), Test methods, Frequency.

The procedure describes the calibration of the Sierra 125A frequency selective voltmeter, which is designed to measure voltage levels from -90 to +32 dbm over a frequency range from 3 to 620 kHz. A VTVM function is also available which measures voltage levels from -20 to + 32 dbm over a frequency range from 1 to 620 kHz. (Author)
PB-174 862 HC$3.00 MF$0.65

MAGNETIC DETECTOR TEST SET, MODEL AN/ASM-6A.
Handbook instrument calibration procedures.
Naval Air Systems Command, Washington, D. C.
28 Feb 67, 15p
NAVAIR-17-20ASM6-1

Descriptors: (*Calibration, *Test sets), Magnetic detectors, Instruction manuals, Test equipment (Electronics), Test methods.

The manual provides calibration instructions for Magnetic Detector Test Set, Model AN/ASM-6A. (Author)
PB-174 863 HC$3.00 MF$0.65

ENGINE GENERATOR ANALYZER SET, AN/USM-86, AN/USM-86A, AN/USM-86B.
Technical manual instrument calibration procedure, AX-07.
Bureau of Naval Weapons Representative, Pomona, Calif. Meteorology Engineering Center.
1 May 67, 15p
NAVAIR-17-20AX-07

Descriptors: (*Calibration, *Test sets), Generators, Instruction manuals, Test equipment (Electronics), Test methods.

The procedure describes the calibration of the AN/USM-86, A, and B engine generator analyzer set. This set consists of two units; the analyzer and the oscillograph. (Author)
PB-174 864 HC$3.00 MF$0.65

STUDY OF LINEAR INDUCTION MOTOR AND ITS FEASIBILITY FOR HIGH-SPEED GROUND TRANSPORTATION.
Garrett Corp., Los Angeles, Calif. AIResearch Mfg. Div.
For primary bibliographic entry see Field 13F.
PB-174 866 HC$3.00 MF$0.65

R-F BRIDGE GEB 1606-A (GENERAL RADIO).
Technical manual instrument calibration procedure, AZ-27.
Bureau of Naval Personnel Representative, Pomona, Calif. Metrology Engineering Center.
1 May 67, 10p
NAVAIR-17-20AZ-27

Descriptors: (*Calibration, *Test sets), Radio equipment, Resistance (Electrical), Electric bridges, Instruction manuals, Test equipment (Electronics), Test methods.

The procedure describes the calibration of the General Radio type 1606-A R-F bridge, which is designed to measure resistance and reactance of antennas, R-F components, and other circuits having relatively low impedances. (Author)
PB-174 884 HC$3.00 MF$0.65

OSCILLOSCOPE PREAMPLIFIER TYPE A OR 53/54A (TEKTRONIX).
Technical manual instrument calibration procedure, VA-07.
Bureau of Naval Personnel Representative, Pomona, Calif. Metrology Engineering Center.
1 Jun 67, 15p
NAVAIR-17-20VA-07

Descriptors: (*Calibration, *Preamplifiers), Instruction manuals, Test equipment (Electronics), Test methods.

The procedure describes the calibration of the Tektronix type A or 53/54A preamplifier. (Author)
PB-174 885 HC$3.00 MF$0.65

VIDEO AMPLIFIER HEWLETT-PACKARD 5261A.
Technical manual instrument calibration procedure, AF-40.
Bureau of Naval Personnel Representative, Pomona, Calif.
1 May 67, 11p
NAVAIR-17-20AF-40

Descriptors: (*Calibration, *Video amplifiers), Instruction manuals, Test equipment (Electronics), Test methods.

The procedure describes the calibration of the Hewlett-Packard 5261A Video Amplifier plug-in unit. (Author)
PB-174 886 HC$3.00 MF$0.65

MICROWAVE POWER METER HEWLETT-PACKARD 431C.
Technical manual instrument calibration procedure, GP-11.
Bureau of Naval Personnel Representative, Pomona, Calif. Metrology Engineering Center.
1 May 67, 19p
NAVAIR-17-20GP-11

Descriptors: (*Calibration, *Meters), Instruction manuals, Radiofrequency power, Test equipment (Electronics), Test methods.

The procedure describes the calibration of the Hewlett-Packard 431C power meter. (Author)
PB-174 887 HC$3.00 MF$0.65

RADIO TEST SET AN/ARM-22.
Technical manual instrument calibration procedure GG-21.
Bureau of Naval Representative, Pomona, Calif. Metrology Engineering Center.
1 Jun 67, 34p
NAVAIR-17-20GG-21
This publication supersedes NAVWEPS-17-20GG-21, PB-168 781 dated 15 June 1965.

Descriptors: (*Calibration, *Test sets), Instruction manuals, Test equipment (Electronics), Test methods, Radio equipment.

The procedure describes the calibration of the AN/ARM-22 Radio Test Set, which is designed to simulate surface-beacon signals and to produce other signals for testing airborne TACAN radio equipment such as the AN/ARN-21 Radio Set. (Author)
PB-174 916 HC$3.00 MF$0.65

RADAR SIGNAL SIMULATOR SM-65UP.
Technical manual instrument calibration procedure, GQ-23.
Harco Engineering, Terminal Island, Calif.
15 May 67, 16p
NAVAIR-17-20GQ-23
Prepared in cooperation with Bureau of Naval Weapons Representative, Pomona, Calif., Meteorology Engineering Center.

Descriptors: (*Calibration, *Simulators), Instruction manuals, Test equipment (Electronics), Test methods, Radar equipment.

The procedure describes the calibration of the SM-65/UP Radar Signal Simulator. (Author)
PB-174 931 HC$3.00 MF$0.65

9D. INFORMATION THEORY

CHANNEL ENCODERS,
Massachusetts Inst of Tech Lexington Lincoln Lab
Leonard M. Goodman. 18 Nov 66, 3p Rept no. JA-2940
ESD-TR67-233
Contract AF 19 (628)-5167
Availability: Published in Proceedings of the IEEE v55 n1 p127-8 1967.

Descriptors: (*Band-pass filters, Performance (Engineering)), (*Spectrum analyzers, *Electrical networks), Signals, Sampling, Coding, Programming (Computers), Efficiency, Information theory.

By dividing an analog signal into a number of nonoverlapping frequency bands and sampling and quantizing each band individually, one can obtain an improvement in encoding efficiency over straight sampling and quantizing for signals whose spectrum is moderately peaked.
AD-653 413 Not available from CFSTI.

PROBLEMS OF INFORMATION TRANSMISSION, VOL. 1, NO. 1, 1965: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
31 Jan 67, 110p Rept no. FTD-HT-66-297
TT-67-62127
Unedited rough draft trans. of Problemy Peredachi Informatsii (USSR), v1 n1 p12-25, 41-51, 57-64, 65-71, 72-9, 113-6, 117-21 1965.

Descriptors: (*Information theory, Automata), Coding, Symbols, Networks, Special functions (Mathematical), Reading machines, Decoding, USSR.

Group 9D—Information theory

Contents: Binary codes with correction of omissions and inserts of the symbol 1; Realization of a Boolean function of n variable by means of a network of threshold elements with n inputs; Some properties of symmetric functions of triadic logic; The behavior of automata in periodic random media and the problem of synchronization in the presence of interference; On the use of ordered texts for extending the possibilities of reading devices; On the complexity of decoding; Cyclic codes correcting uniform error packets.
AD-653 548 HC$3.00 MF$0.65

A BINARY LINEAR TRANSFORMATION FOR REDUNDANCY REDUCTION,
Massachusetts Inst of Tech Lexington Lincoln Lab
Leonard M. Goodman. 20 Jan 67, 3p Rept no. JA-2976
ESD-TR-67-308
Contract AF 19(628)-5167
Availability: Published in Proceedings of the IEEE v5 n3 p467-8 Mar 1967.

Descriptors: (*Coding, Transformations (Mathematics)), Matrix algebra, Efficiency.

By using a linear transformation matrix consisting of only plus or minus 1's prior to encoding a set of dependent signals a substantial improvement in encoding efficiency can be obtained in many interesting cases. (Author)
AD-653 668 Not available from CFSTI.

ECONOMIC THEORY OF INFORMATION (LECTURE NOTES),
California Univ Los Angeles Western Management Science Inst
For primary bibliographic entry see Field 12B.
AD-654 163 HC$3.00 MF$0.65

SOURCE ENCODING IN THE PRESENCE OF RANDOM DISTURBANCE.
California Univ., Berkeley. Space Sciences Lab.
D. J. Sakrison. 2 Feb 67, 9p NASA-CR-84658
Contract NGR-05-003-143
Its Ser. No. 8, Issue No. 4

Descriptors: *Random variable, *Vector, Disturbance, Encoding, Ergodic, Error, Mean, Output, Random, Receiver, Source, Square, Time, Variable.

For abstract, see STAR 05 15.
N67-28012 HC$3.00 MF$0.65

TECHNIQUES AND ERRORS IN MEASURING CROSS- CORRELATION AND CROSS-SPECTRAL DENSITY FUNCTIONS.
Measurement Analysis Corp., Los Angeles, Calif.
L. D. Enochson, R. D. Kelly, and L. A. Rondinelli. 1966, 214p NASA-CR-74505
Contract NAS8-20179

Descriptors: *Cross correlation, *Dynamic pressure, *Error, Acquisition, Analog, Analyzer, Data, Density, Digital, Flight, Function, Hybrid, Instrument, Measurement, Random, Spectral, Test, Transducer, Tunnel, Variable, Wind.

For abstract, see STAR 05 15.
N67-28373 HC$3.00 MF$0.65

9E. SUBSYSTEMS

AN IMPROVED SYSTEM FOR RECORDING THE PHASE AND AMPLITUDE OF VLF AND LF STANDARD FREQUENCY TRANSMISSION,
National Bureau of Standards, Boulder, Colo.
For primary bibliographic entry see Field 17B.
AD-433 249 HC$3.00

THE APPLICATION OF INTEGRATED CIRCUITRY TO SPACECRAFT ELECTRONIC SYSTEMS,
Aerospace Corp., El Segundo, Calif. Technical Operations.
For primary bibliographic entry see Field 22B.
AD-459 635 HC$3.00

SINGULAR EXTREMALS,
Grumman Aircraft Engineering Corp Bethpage N Y Research Dept
For primary bibliographic entry see Field 12B.
AD-653 425 Not available from CFSTI.

A TECHNIQUE FOR DETERMINING AN INDEX OF VISUAL ALERTNESS FROM THE ELECTROENCEPHALOGRAM,
Naval Air Development Center Johnsville Pa Aerospace Medical Research Dept
For primary bibliographic entry see Field 6P.
AD-653 451 HC$3.00 MF$0.65

THE INPUT/OUTPUT AND CONTROL SYSTEM OF THE MOORE SCHOOL PROBLEM SOLVING FACILITY.
Pennsylvania Univ Philadelphia Moore School of Electrical Engineering
For primary bibliographic entry see Field 9B.
AD-653 465 HC$3.00 MF$0.65

SIMULTANEOUS MULTIPLE PARAMETER ADJUSTMENT IN ADAPTIVE SYSTEMS USING A SINGLE PERTURBATION SIGNAL.
Technical rept.,
Yale Univ New Haven Conn Dunham Lab
Kumpati S. Narendra, and Theodore S. Baker.
15 Apr 67, 24p Rept no. CT-11
Contract N00014-67-A-0097-0004

Descriptors: (*Adaptive control systems, *Perturbation theory), (*Electronics, Systems engineering), Optimization, Performance (Engineering), Real time, Topology, Computers, Simulation, Feasibility studies, Signals, Correlation techniques.

A gradient method is presented for adjusting the parameters of a system to optimize a performance criterion. The partial derivatives of the performance index with respect to the adjustable parameters are obtained as real time signals, using a single perturbation signal for a system with unknown structure, but favorable topology. Computer simulations are included to indicate the feasibility of the approach. The adaptive control method using a single perturbation signal, as proposed here, has many features in common with the well-known parameter perturbation scheme.
AD-653 474 HC$3.00 MF$0.65

PARAMETRIC AMPLIFIER,
Foreign Technology Div Wright-Patterson AFB Ohio
Wu Wu. 14 Mar 67, 12p Rept no. FTD-HT-66-425
TT-67-62117
Edited trans. of Wu Hsien Tien (Chinese People's Republic), n12 p1-2 1964.

Descriptors: (*Parametric amplifiers, *Design), Oscillators, High frequency, Capacitance, Signals, Noise, Circuits, Power amplifiers, Theory, Voltage, Pumps, Electron tubes, USSR.

The paper discusses the fundamental theory and construction of parametric amplifiers. The power source of a parametric amplifier comes from a high-frequency oscillator. Variable parametric amplifiers with variable-capacitance p-n junction diodes have a lower noise figure than electron tube amplifiers. Capacitance of a p-n junction diode can be changed by varying the external voltage supply to the unit. The requirements of variable-capacitance parametric amplifiers are low quiescent capacitance, wide capacitance variation range, and high quality factor. Parametric amplifiers derive their pump power from an a.c. power supply unit. Theoretical studies and experiments verified that the frequency of a pump signal is several times higher than the frequency of an incoming signal, e.g., an incoming signal of 1000 mc may require a pump frequency of 10,000 mc or higher. The sum and difference are obtained by mixing the incoming signal frequency and pump frequency in a converting circuit. The converting circuit operates on the same principle as a superheterodyne receiver. Author points out that variable-inductance elements and special electron-beam tubes can also be used in parametric amplifier construction. (Author)
AD-653 549 HC$3.00 MF$0.65

ANALOG-DIGITAL DEVICE FOR MODELING PROBLEMS OF NONSTATIONARY THERMAL CONDUCTIVITY,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20M.
AD-653 551 HC$3.00 MF$0.65

MICROMINIATURE MONOLITHIC CROSSPOINT INTERCONNECTIONS.
Quarterly rept. no. 3, 1 Jan-31 Mar 67,
Radio Corp of America New York Advanced Communications Lab
S. Yuan, W. Buchsbaum, M. Kalet, and L. Spann.
Jun 67, 29p Rept no. CR-67-565-11
ECOM-02260-3
Contract DA-28-043-AMC-02260 (E)
See also AD-650 106.

Descriptors: (*Circuit interconnections, *Microminiaturization (Electronics)), Resistance (Electrical), Integrated circuits, Manufacturing methods, Diodes (Semiconductor), Feasibility studies.

The report describes the circuit and the fabrication aspects of the microminiature monolithic crosspoints. The tolerances of the shunt resistances are determined by computer studies. Power required to operate the control gates at various supply voltages for the 1 x 1 crosspoints is given. The effect of adhesive material on the nichrome thin-film resistors is presented. Methods of providing feed throughs are described and results given. Other approaches of fabricating the crosspoints are briefly discussed with respect to their manufacturability. (Author)
AD-653 597 HC$3.00 MF$0.65

RESEARCH-ENGINEERING AND SUPPORT FOR TROPICAL COMMUNICATIONS.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 17B.
AD-653 608 HC$3.00 MF$0.65

RESEARCH-ENGINEERING AND SUPPORT FOR TROPICAL COMMUNICATIONS.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 17B.
AD-653 615 HC$3.00 MF$0.65

RADIATION EFFECTS ON THIN-FILM INTEGRATED CIRCUIT ELEMENTS.
North American Aviation Inc Anaheim Calif Autonetics Div
For primary bibliographic entry see Field 18H.
AD-653 623 HC$3.00 MF$0.65

INTEGRATED CIRCUITS FOR PORTABLE RADAR EQUIPMENT.
Quarterly rept. no. 4, 1 Dec 66-28 Feb 67,
Texas Instruments Inc Dallas Semiconductor-Components Div
E. Clayton Teague, Stacy B. Watelski, Charles

F. Dennis, and Louay Sharif. Jun 67, 38p Rept no. 03-67-31
ECOM-02029-4
Contract DA-28-043-AMC-02029 (E)
See also AD-650 040.

Descriptors: (*Integrated circuits, *Radar equipment), Portable, Gallium arsenides, Germanium, Epitaxial growth, Etching, Deposition, Resistance (Electrical).

The results of experiments on factors determining the surface structure and topography of the germanium growth front during selective etch and deposition in GaAs are summarized. Experimental data have been obtained which show that preferential growth near the pocket edges can be eliminated by partially refilling the etched regions. The surface topography of the selectively deposited germanium is determined primarily by the substrate temperature and the GeCl4 concentration. The device to be fabricated in the Ge pockets is described. (Author)
AD-653 628 HC$3.00 MF$0.65

RESISTORS FOR MICROPOWER CIRCUITS.
Final rept., no. 6, 1 Jul 65-31 Dec 66,
Speer Carbon Co Niagara Falls N Y
C. F. Parks. May 67, 53p Rept no. R-152, SCC-27
ECOM-01524-F
Contract DA-28-043-AMC-01524 (E)
Contains color repro. in B/W only.

Descriptors: (*Resistors, *Circuits), Encapsulation, Wire, Lead, Coatings, Voltage, Temperature, Oxides, Thallium, Welding.

Micropower resistors of 4.7, 10, 22, 47, and 100 megohms resistance have been prepared, tested and delivered. The resistors, including substrate, were processed from raw materials to the finished product. Substrates were pressed, fired, and centerless ground to less than 50 mils diameter. Thallium oxide glaze resistive films were applied and fired, and were then helixed to the desired resistance values. Lead wires were attached by percussive welding, and a conformal silicone coating was applied as an encapsulation. The resulting miniature resistors are mechanically strong and have generally good to excellent electrical properties. Some instability problems were encountered with the 4.7 megohm samples prepared initially, but these were generally corrected in the higher value resistors. The resistance temperature characteristic performance of the 10 to 100 megohm resistors was in the range of -100 to -250 ppm/C, outside of the limits prescribed in the technical guideline. Problems were also encountered in resistance tolerance at 100 megohms, terminal strength, resistance to solder heat, and resistance at 10 MC of the 47 and 100 megohm units. In all other tests, however, including temperature cycling, low temperature operation, moisture resistance with and without power, voltage coefficient, current noise, stray capacitance and 1000 hour load life, satisfactory performance was demonstrated at all specified resistance levels. (Author)
AD-653 630 HC$3.00 MF$0.65

RESEARCH ON DISTRIBUTED FERRITES FOR CROSSED-FIELD MICROWAVE DEVICES.
Raytheon Co Waltham Mass Microwave and Power Tube Div
For primary bibliographic entry see Field 9A.
AD-653 638 HC$3.00 MF$0.65

RESEARCH ON DISTRIBUTED FERRITES FOR CROSSED-FIELD MICROWAVE DEVICES.
Quarterly rept. no. 4, 10 Nov 66-9 Feb 67,
Raytheon Co Waltham Mass Microwave and Power Tube Div
William A. Smith, Daniel Masse, John M. Osepchuk, Robert Plumridge, and Lawrence Tisdale. May 67, 46p Rept no. PT-1343
ECOM-02032-4
Contract DA-28-043-AMC-02032 (E), ARPA Order-679 (01)

Descriptors: (*Ferrites, *Crossed field devices), (*Microwave amplifiers, Ferrites), Delay lines, Oscillators, Backward-wave amplifiers, Dielectric properties, L band, Waveguides, Bandwidth, S band, Environmental tests, Hot pressing, Bonding, Tests, Metals, Brazing, Theory, Magnetic fields.

The objective of this program is to develop the knowledge and technology necessary to take full advantage of the unidirectional attenuative properties of ferrites in achieving improved gain and bandwidth in crossed-field microwave amplifiers and oscillators. During this fourth quarterly period, activities included further cold testing of ferrite materials in the L-band cold test vehicle and in the S-band QKS1267 Amplitron. A number of brazing experiments were carried out, and considerable effort was expended in the study of hot pressing techniques for the bonding of ferrites to alumina. The results were promising. The results of both theoretical and experimental studies of broadbanding have been encouraging. In particular, desirable properties have been demonstrated over half an octave in S-band with a porous manganese ferrite. The results of the first year's work suggest that good rf performance is fairly easy to achieve but that the demonstration of these properties in an actual CFA must await solution of the technological problems of bonding and exposure of the ferrites the brazing conditions. The major aim of the second year will be the realization of hot tests at the earliest possible time. (Author)
AD-653 651 HC$3.00 MF$0.65

A MATRIX METHOD FOR OBTAINING THE TRANSIENT RESPONSE OF A FILTER.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
J. M. Freeland. Dec 66, 13p Rept no. RAE-TR-66372

Descriptors: (*Filters (Electromagnetic wave), Transients), (*Electrical networks, Mathematical analysis), Differential equations, Integral transforms, Capacitance, Resistance (Electrical), Inductance, Numerical analysis.

A matrix method is described for obtaining the transient response of a passive electrical filter. The transfer function is first derived in partial fraction form, and then the appropriate inverse Laplace transform can be determined directly. (Author)
AD-653 690 HC$3.00 MF$0.65

DUPLEXER FOR SIDE-LOOKING RADAR.
Final rept., 1 Oct 64-30 Dec 66,
Litton Precision Products Inc Morris Plains N J Airtron Div
M. King, and B. Maher. Apr 67, 72p Rept no. R11-529
ECOM-00280-F
Contract DA-28-043-AMC-00280 (E)
See also AD-653 782.

Descriptors: (*Radar duplexers, *Side-looking radar), Phase shifters, Limiters, Waveguide circulators, Yttrium compounds, Microwave equipment, Garnet, Ferrites, Waveguide switches, Duplexers (Electronic), Magnesium compounds, Nickel compounds.

The report describes the research and development directed towards advancing the state of the art in the field of microwave duplexers intended for application in a side-looking radar. A three port junction circulator was developed capable of operating at a peak power level of 300 kw. Many ferrite materials were evaluated for use in this device. Single crystal yttrium iron garnet was employed as a power sensitive element in a completely solid state limiting device. Ferrite materials investigated during this program did not wholly possess both the peak power and remanent characteristics for use in the latching four port switch. (Author)
AD-653 781 HC$3.00 MF$0.65

DUPLEXER FOR SIDE-LOOKING RADAR.
Quarterly rept. no. 4, 1 Apr 65-30 Dec 66,
Litton Precision Products Inc Morris Plains N J Airtron Div
M. King, and B. Maher. Apr 67, 21p Rept no. R11-524
ECOM-00280-4
Contract DA-28-043-AMC-00280 (E)
See also AD-623 853.

Descriptors: (*Radar duplexers, *Side-looking radar), Phase shifters, Limiters, Waveguide circulators, Ferrites, Magnetic cores, Nickel compounds, Magnesium compounds, Yttrium compounds, Microwave equipment, Cobalt compounds, Garnet.

The following information is contained in the report: results of the investigation of cobalt doped magnesium, manganese ferrite materials in the three port circulator; results of the investigation of dysprosium doped yttrium, iron garnet materials in the three port circulator; results of the 'deliverable model' microwave limiter; and the results of the investigation of cobalt doped magnesium, manganese ferrite and hybrid garnet materials in the four port switch.
AD-653 782 HC$3.00 MF$0.65

FORESHORTENED CENTER-FED VHF ANTENNA.
Semiannual technical rept.
General Dynamics/Electronics Rochester N Y
30 Jan 67, 30p
Contract DA-28-043-AMC-02477 (E)

Descriptors: (*Antennas, Very high frequency), Antenna feeds, Dipole antennas, Admittance, Electrical impedance, Vehicles.

The report covers a Foreshortened Center-Fed VHF Antenna. This type of structure provides optimum decoupling from a vehicle frame, resulting in minimal pattern and impedance effects. The antenna is capable of operation in a range from 30 to 76 mc and is fully compatible with matching unit-base MX-6707 ( )/VRC. It has a reduced length (six foot maximum), direct replacement for the whip assembly of the AS-1729 ( )/VRC antenna. When installed in military vehicles on antenna base assembly MX-6707 ( )/VRC and used with Receiver-Transmitter Radios RT-246 ( )/VRC and RT-524 ( )/VRC, it is automatically tuned to one of ten subbands of the radio set. Also, it is capable of operating with the AN/PRC-70 and AN/PRC-25 radio sets. (Author)
AD-653 843 HC$3.00 MF$0.65

300 MILLIWATT X-BAND TRIODE OSCILLATOR.
Quarterly rept. no. 5, 1 Jan 67-1 Apr 67,
General Electric Co Owensboro Ky Tube Dept
J. M. Connelly, and L. F. Jeffrey. Jun 67, 41p
ECOM-01795-5
Contract DA-28-043-AMC-01795 (E)

Descriptors: (*Microwave oscillators, Triodes), (*Triodes, X band), Microwave equipment, Life expectancy, Performance (Engineering), Seals.

Fifty Y-1613-E triodes were constructed for evaluation at X-Band. These Y-1613-E triodes have a heavier anode seal than the previously constructed triodes, and two versions were built: one version having grids with an interlaced support wire, and the other with support bar grids. A method for minimizing early life power output decay is described. Curves are given showing anode seal temperature versus anode dissipation. Performance curves show the difference in tuning range, with

a representative sample of triodes, between a slot-coupled cavity oscillator and a similar unit using capacitive probe output coupling. The problems encountered in the slot-coupled version are discussed, and the reasons given for changing to a circuit using capacitive probe output coupling. Sketches of both types are included. Final life test results on the previously reported triode cavity oscillator are shown. (Author)
AD-653 846 HC$3.00 MF$0.65

HORIZONTAL VLF TRANSMITTING ANTENNAS NEAR THE EARTH,
Naval Ordnance Lab Corona Calif
Elwin W. Seeley, and Philip H. Wiborg. 15 May 67, 59p Rept no. NOLC-721

Descriptors: (*Antennas, Very low frequency), Dipole antennas, Antenna radiation patterns, Electrical impedance, Efficiency, Attenuation.

Problems encountered in VLF radiation are outlined and variations of the horizontal dipole are proposed as a solution. Equations are derived for the radiation patterns, input impedance, and efficiency of the broad-band antenna (terminated in its characteristic impedance) and of the narrow-band antenna (open-terminated) where the antenna is fed at any position along its length. Data are presented to substantiate that (1) the horizontal dipole near the earth exhibits super gain when several parallel conductors are used; (2) the radiation efficiency of 'n' closely spaced conductors is 'n' times greater than when the same conductors are spaced one-half wavelength apart; and (3) the lossy horizontal dipole normally does not resonate when its length is a multiple of one-half wavelength. The 'lossy lengthening factor' is shown in a plot of the resonant length as a function of 'Q'. This plot applies generally to all lossy dipoles. (Author)
AD-653 851 HC$3.00 MF$0.65

ELECTRON COMMUTATOR,
Foreign Technology Div Wright-Patterson AFB Ohio
V. S. Zhernov, E. P. Murashov, N. V. Ryzhov, and A. P. Serzhantov. 28 Feb 67, 19p Rept no. FTD-HT-66-415
TT-67-62150
Elektronnyi Kommutator, unedited rough draft trans. of Yadernoe Priborostroenie; Nauchno-Tekhnicheskii Sbornik (USSR) n1 p139-50 1964.

Descriptors: (*Electronic commutators, Transistors), USSR, Electronic switches, Pulse generators.

The development of a transistorized electronic switch is reported. The switch is intended for converting several slow-varying d-c voltages into proportional-amplitude pulses and combining these pulses for a common load. It is assumed that all N d-c voltage sources are independent and have an internal impedance of up to 100 kohms. The voltage may vary within 0.005--5 v. The switch comprises voltage-to-pulse converters K sub 1, K sub 2, K sub N, a clock-pulse generator G, a distributor that sends clock pulse to individual converters, and a matching circuit which combines he resulting pulses. An inverse-connected n-p-n Si transistor (P103) is used in the converter. The clock-pulse generator has a conventional blocking-generator circuit; its frequency varies by plus or minus 20% with temperature within -10 + 50C. The ferrite-transistor distributor circuit is equipped with a noise filter. The matching circuit includes a common-base stage and an emitter follower; the circuit was tested with 50 converters at -10 + 50C. (Author)
AD-653 967 HC$3.00 MF$0.65

STUDY OF PLASMA SHEATH EFFECTS ON ANTENNAS.
Final rept., 1 Jan 64-31 Mar 67
Arizona Univ Tucson Engineering Experiment Station
George Tyras. Apr 67, 19p
AFCRL-67-0300
Contract AF 19 (628)-3834

Descriptors: (*Antennas, *Plasma sheath), Slot antennas, Plasma physics, Theory, Compressive properties, Hydrodynamics, Differential equations, Reports, Dielectric properties, Bessel functions, Electromagnetic waves.

The Final Report under Contract AF19 (628)-3834, summarizes the work carried out during the period 1 January 1964-31 March 1967 in the Engineering Experiment Station, The University of Arizona. The work covers experimental and theoretical investigations into the problem of plasma sheath effects on antennas. In the area of experimental investigations, the effects of plasma sheath homogeneities and nonuniformities on the radiation pattern and input impedance were assessed. In the area of theoretical investigations, the effects of the structure curvature and the radiation patterns were assessed. The effect of plasma compressibility was also investigated. (Author)
AD-653 995 HC$3.00 MF$0.65

NONRECIPROCAL TUNNEL DIODE DISTRIBUTED AMPLIFIER,
Texas Univ Austin Dept of Electrical Engineering
Randolph C. Matson, Cyrus O. Harbourt, and Oren B. Kesler. 26 Aug 66, 4p
AFOSR-67-1406
Grant AF-AFOSR-766-66
Availability: Published in IEEE Transactions vED-14 n3 p174-5 Mar 1967.

Descriptors: (*Distributed amplifiers, Tunnel diodes), Ferromagnetic materials, Electrical properties, Configuration.

The correspondence suggests a method for the construction of a distributed tunnel diode amplifier. The configuration is a strip-line geometry with a narrow tunnel diode along the center line of a metallic strip of appreciable width. Nonreciprocal properties are achieved with the placement of ferrite material on both sides of the diode. The ferrite material is magnetized uniformly in the plus or minus x direction. A resistive shunt placed at both outer edges of the strip line forms the final termination. This configuration is shown. At high frequencies the circulating magnetic fields will be weak at the outer edges. Thus the resistive shunt will not cause a serious amount of attenuation. At low frequencies the resistive shunt can cause substantial attenuation. Dc stability conditions are used to determine the parameters of the ferrite and the resistive shunt. (Author)
AD-654 025 Not available from CFSTI.

3.2 MILLIMETER WAVE OSCILLATOR.
Quarterly progress rept. no. 2, 1 Jan-31 Mar 67,
Hughes Research Labs Malibu Calif
Robert P. Bryan. Jul 67, 23p
ECOM-02225-2
Contract DA-28-043-AMC-02225(E)
See also AD-650 768.

Descriptors: (*Microwave oscillators, Millimeter waves), (*Klystrons, Extremely high frequency), Electromagnetic pulses, Magnets, Interactions, Electron guns, Pulse modulation.

This program involves the development of a permanent magnet focused 10 kW pulsed distributed interaction klystron which oscillates at 93.75 GHz and has been both environmentally and life tested. It is believed that this objective may be reached when the necessary improvements are made in an Exploratory Development Model tube developed under a previous contract. A permanent magnet weighing less than 25 lb should be possible. In addition, it is indicated that a higher perveance electron gun will be required to realize a higher efficiency with a shorter cavity structure tube; further efforts to improve the efficiency of the tube have been suspended. Studies indicate that the use of an electron gun with an interception grid to modulate the beam current is feasible. Construction of test diodes, tube subassemblies, and the short pulse modulator continues. (Author)
AD-654 032 HC$3.00 MF$0.65

INVESTIGATION OF SYNCHRONOUS-WAVE R-F TO D-C CONVERSION.
Triannual rept. no. 2, 1 Oct 66-31 Jan 67,
Utah Univ Salt Lake City Microwave Device and Physical Electronics Lab
D. C. Watson, K. I. Talbot, C. C. Johnson, and R. W. Grow. May 67, 25p Rept no. UTEC-MD-67-008
ECOM-02290-2
Contract DA-28-043-AMC-02290 (E)

Descriptors: (*Rectifiers, *Cyclotron waves), Microwave equipment, Traveling-wave tubes, Waveguide couplers, Radiofrequency power, Direct current, Power, Electron guns, Electron tube parts, Electron beams, Crossed field devices, Microwave amplifiers, Energy conversion.
Identifiers: Power converters.

The investigation of cyclotron-synchronous wave r-f to d-c power conversion is continuing. Further analytical evaluation and preparation for experimental evaluation are reported. A Pierce-type electron gun and a 3GHz Cuccia cavity have been designed. A collector of low secondary-emission coefficient is being constructed. The electron gun and collector will be pretested in a gun-collector tester also being constructed. A simple analysis of the conversion problem assumes a discontinuity of the B sub z field at z = 0. This analysis predicts the asymptote values of conversion efficiency obtained in earlier computer solutions for short transition length. Another simple analysis, using results from a Hamilton-Jacobi investigation of the conversion problem, is given to show why the power converter is linear in operation as an a-c power supply, a result already obtained experimentally. The results of these analyses have indicated a definite direction for the experimental evaluation of the fourth tube. Both reversed-field conversion possibilities and a-c operation will be investigated when the new tube is ready for tests. (Author)
AD-654 039 HC$3.00 MF$0.65

CYCLOTRON WAVE POWER CONVERTER.
Technical rept.,
Utah Univ Salt Lake City Microwave Device and Physical Electronics Lab
D. C. Watson, K. I. Talbot, and C. C. Johnson. Mar 67, 81p Rept no. UTEC-MD-67-009
ECOM-02372-4
Contract DA-36-039-AMC-02372 (E)

Descriptors: (*Rectifiers, Cyclotron waves), Radiofrequency power, Power, Space charges, Waveguide couplers, Direct current, Efficiency, Microwave equipment, Electron beams, Microwave amplifiers, Energy conversion.
Identifiers: Power converters.

The cyclotron-wave power converter is useful over the same frequency range as the Cuccia coupler. Its theoretical power-handling capability is very high, of the order of megawatts for a wide-gap Cuccia cavity and a few amperes beam current. Theoretical efficiency ranges from 0.60 to over 0.95, depending on power ratio, transistion length, the type of collector, and the final value of the B-field. These results are summarized. Measured efficiencies have been significantly lower, due mainly to difficulties associated with collector current reduction under r-f conditions with depressed collector voltage. (Author)
AD-654 049 HC$3.00 MF$0.65

DESIGN OF INTEGRATED ELECTRONIC D/A CONVERTER FOR DRIVING CRT DISPLAY OF ELECTRONIC SCANNER RADAR.

Army Electronics Command Fort Monmouth N J
For primary bibliographic entry see Field 17I.
AD-654 131 HC$3.00 MF$0.65

CIRCAL: ON-LINE CIRCUIT DESIGN.
Revised ed.,
Massachusetts Inst of Tech Cambridge Dept of Electrical Engineering
M. L. Dertouzos. 28 Nov 66, 20p
Contract Nonr-4102 (01), Grant NsG-498
Revision of manuscript submitted 8 Sep 66.
Availability: Published in Proceedings of the IEEE v55 n5 p637-54 May 1967.

Descriptors: (*Circuits, Design), (*Man-machine systems, Digital computers), Display systems, Input-output devices, Graphics.
Identifiers: CIRCAL.

On-line circuit design involves interaction between a designer who initiates circuit modifications on the basis of circuit performance, and a digital computer which calculates the performance resulting from such modifications. Besides network analysis, the flexibility of an on-line utility makes possible a variety of other services such as on-line definition and modelling of new circuit elements, while graphical input and display devices facilitate man-machine communication, requiring no programming knowledge on the part of the user. Compared to conventional design or batch-computer design, the on-line approach includes advantages such as savings in design time and cost, and progressive accumulation of diverse and accurate knowledge about expected circuit behavior, before actual construction is undertaken. This paper discusses a family of on-line nonlinear circuit-design systems known as CIRCAL, in terms of features visible to a user, internal structure, supporting theory, experience, and future plans. (Author)
AD-654 139 Not available from CFSTI.

THE DEVELOPMENT OF WIDEBAND WAVEGUIDE-MOUNTED FERRITE-PENCIL PHASE SHIFTERS FOR X-BAND,
Royal Aircraft Establishment Farnborough (England)
B. A. Hodson. Oct 66, 59p Rept no. RAE-TR-66337

Descriptors: (*Phase shifters, X band), Broadband, Great Britain, Ferromagnetic materials, Microwave equipment, Magnetic fields, Waveguides, Rods.

The ferrite pencil phase shifters described use a longitudinal direct magnetic field of variable intensity to change the tensor permeability of the ferrite within the guide, and consequently the phase of the wave travelling through it. The Mark I version is suitable for use over a 2.5 Gc/s band centered on 9.5 Gc/s. It has a low insertion loss, and a maximum phase shift of 1.2 wavelengths. The Mark II version is suitable for use over a 1.65 Gc/s band centred on 8.8 Gc/s, it has a low insertion loss, a minimum phase shift of 1 wavelength, and a maximum phase shift of 2.5 wavelengths. (Author)
AD-654 144 HC$3.00 MF$0.65

ELECTRONIC SCALE FOR MEASURING MASS FLOW,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
LA-3659 HC$3.00 MF$0.65

COMPUTER PROGRAMS FOR ANTENNA FEED SYSTEM DESIGN AND ANALYSIS. VOLUME I - PROGRAMS AND SAMPLE CASES.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A. Ludwig. 15 Apr 67, 175p NASA-CR-84810, JPL-TR-32-979, VOL. I
Contract NAS7-100

Descriptors: *Antenna, *Computer program, *Feed system, *Systems analysis, Design, Distortion, Efficiency, Far, Field, Noise, Operation, Pattern, Radiation, Reflector, Scattering, Structural, Synthesis, System, Temperature.

For abstract, see STAR 05 15.
N67-28721 HC$3.00 MF$0.65

AN ON-LINE DISTRIBUTION ANALYZER AND FADE COUNTER FOR TIME VARYING SIGNALS.
Technical rept.,
Institutes for Environmental Research, Boulder, Colo.
Donald V. Glen. Apr 67, 53p ITSA-33
IER-33

Descriptors: (*Distribution, *Data transmission systems), (*Signals, *Attenuation), (*Integrated circuits, Signals), Electric wire, Circuits, Transistors, Magnetic tape, Electrical impedance, Solid state physics, Time, Stability.

The report describes a Portable Distribution Analyzer (PDA) designed for automatic or manually controlled analysis of time variant data signals at a field site or in the laboratory, a description of circuit logic, and the use of solid-state devices, such as integrated circuits and transistor circuitry. Operation of the analyzer, for the purpose of obtaining cumulative amplitude distributions and computation of the number of signal fades, is also presented. (Author)
PB-174 839 HC$3.00 MF$0.65

HEIGHT GAIN, LOCATION GAIN, AND CORRELATION IN IRREGULAR TERRAIN AT 20, 50, AND 100 MHz.
Technical rept.,
Institutes for Environmental Research, Boulder, Colo.
A. P. Barsis, and M. J. Miles. Apr 67, 71p ITSA-35
IER-35

Descriptors: (*Gain, *Antennas), High frequency, Terrain, Signals, Measurement, Antenna arrays, Very high frequency, Very low frequency.

Further results on height gain, location gain, and correlation are presented which are based on data obtained from a comprehensive measurement program in irregular terrain at frequencies of 20, 50, and 100 MHz. Specifically, it was found that height gain, but not location gain, is independent of path distance for transmission paths up to 80 km long. Location gain is defined as the reduction in transmission loss obtainable by a search within a 100-m radius of a nominal receiving point. The measurement program permitted simulation of the interaction between net and relay type communication links by simultaneous recordings of signals received from a test station with low transmitting antenna height, and a commercial frequency modulation broadcast station (not co-located) with a high transmitting antenna. It was found that the correlation coefficient between transmission loss values from the two sources is close to unity when the transmission paths have a small angular separation, but decreases with increasing angle between transmission paths. (Author)
PB-174 840 HC$3.00 MF$0.65

QUARTERLY RADIO NOISE DATA FOR DECEMBER, JANUARY, FEBRUARY 1965-66.
Institutes for Environmental Research, Boulder, Colo.
For primary bibliographic entry see Field 17B.
PB-174 841 HC$3.00 MF$0.65

A TABLE FOR COMPUTATIONS OF ARRAY FUNCTIONS USING FINITE Z-TRANSFORMS.
Technical rept.,
Institutes for Environmental Research, Boulder, Colo.
M. T. Ma, and L. C. Walters. May 67, 113p
ITSA-36
IER-36

Descriptors: (*Antenna arrays, *Integral transforms), Linear systems, Antenna radiation patterns, Excitation, Mathematical analysis, Tables.

Based on a new approach of applying finite Z-transforms to the analysis of radiation characteristics from an equi-spaced linear antenna array, a table of array functions expressed in closed form is established for many excitation functions whose finite Z-transforms are derivable from known material. Each array function is then numerically calculated for different numbers of elements (5, 10, 15, and 20) and for three typical element spacings: Lambda/2, lambda/3, and lambda/4 with lambda as the free-space wavelength. These numerical data are finally plotted to give clear sets of radiation patterns from which any array designer can acquire all the necessary designing information as to the excitations, spacings, and number of elements required to achieve approximately certain radiation specifications. (Author)
PB-174 843 HC$3.00 MF$0.65

9F. TELEMETRY

FRONTAL IONIZATION PHENOMENA DURING THE ELDO SLV FLIGHT.
Selenia S. P. A., Rome (Italy).
D. Cunsolo, and A. Gilardini. 15 Feb 65, 115p
ELDO-TR-2, TR-65/325
Prepared for Eldo

Descriptors: *Eldo launch vehicle, *Gaseous ionization, *Shock wave, *Signal transmission, Aerothermodynamics, Collision, Density, Effect, Electron, Field, Flow, Frequency, Frontal, Gaseous, Hypersonic, Ionization, Loss, Noise, Shock, Signal, Telemetry, Transmission, Wave.

For abstract, see STAR 05 15.
N67-27925 HC$3.00 MF$0.65

E L D O- A VEHICLE - FRONTAL IONIZATION EFFECTS ON THE RADIATION OF THE THIRD STAGE TELEMETRY ANTENNAS.
Selenia S. P. A., Rome (Italy).
D. Cunsolo, P. De Santis, and A. Gilardini. 7 Dec 66, 122p ELDO-TR-3, TR-66/347
Prepared for Eldo

Descriptors: *Eldo launch vehicle, *Ionization, *Radiation field, *Radio antenna, *Shock layer, Aerothermodynamics, Antenna, Breakdown, Density, Effect, Electron, Field, Flow, Frontal, Impedance, Layer, Radiation, Radio, Shock, Stage, Telemetry, Third.

For abstract, see STAR 05 15.
N67-27926 HC$3.00 MF$0.65

COMPUTER PROGRAMS FOR ANTENNA FEED SYSTEMS DESIGN AND ANALYSIS. VOLUME II - PROGRAM LISTINGS.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A. Ludwig. 15 Apr 67, 70p NASA-CR-84813, JPL-TR-32-979, VOL. II
Contract NAS7-100

Descriptors: *Antenna, *Computer program, *Feed system, Analysis, Bibliography, Design, Distortion, Far, Field, List, Pattern, Reflector, Structural, Synthesis.

For abstract, see STAR 05 15.
N67-28736 HC$3.00 MF$0.65

THE EFFECTS OF TRACKING STATION LOCATION UNCERTAINTY AND MEASUREMENT BIAS ERRORS DURING PHASES OF THE APOLLO MISSION.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. L. Cooley. Feb 67, 13p NASA-TM-X-55803, X-507-67-60

Descriptors: *Apollo project, *Ground station, *Navigation system, *Noise measurement, Bias, Effect, Ground, Location, Measurement, Mission, Navigation, Noise, Phase, Position, Project, Spacecraft, Station, System, Uncertainty.

For abstract, see STAR 05 15.
N67-28823 HC$3.00 MF$0.65

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. CONVERSION TECHNIQUES

FIBERCELL OVERHEAT HAZARD DETECTION SYSTEM.
Whittaker Corp San Diego Calif Narmco Research and Development Div
For primary bibliographic entry see Field 1D.
AD-653 996 HC$3.00 MF$0.65

INVESTIGATION OF SYNCHRONOUS-WAVE R-F TO D-C CONVERSION.
Utah Univ Salt Lake City Microwave Device and Physical Electronics Lab
For primary bibliographic entry see Field 9E.
AD-654 039 HC$3.00 MF$0.65

CYCLOTRON WAVE POWER CONVERTER.
Utah Univ Salt Lake City Microwave Device and Physical Electronics Lab
For primary bibliographic entry see Field 9E.
AD-654 049 HC$3.00 MF$0.65

POWER SYSTEM CONFIGURATION STUDY AND RELIABILITY ANALYSIS QUARTERLY PROGRESS REPORT, 7 JAN. - 6 APR. 1967.
TRW Systems Group, Redondo Beach, Calif.
W. G. Binckley. 6 Apr 67, 70p NASA-CR-84816, E-7441.2-005
Contracts NAS7-100, JPL-951574
Prepared for Jpl

Descriptors: *Component reliability, *Electromagnetic compatibility, *Spacecraft power supply, *Weight factor, Array, Battery, Compatibility, Component, Control, Efficiency, Electromagnetic, Factor, Failure, Power, Redundancy, Reliability, Solar, Spacecraft, Supply, System, Weight.

For abstract, see STAR 05 15.
N67-28771 HC$3.00 MF$0.65

FUEL CELL RELIABILITY ASSESSMENT QUARTERLY PROGRESS REPORT, 8 JAN. - 8 APR. 1967.
Allis-chalmers Mfg. Co., Milwaukee, Wis.
R. P. Bruno. 8 May 67, 35p NASA-CR-84826, NAS8-2696-QPR-1204
Contract NAS8-2696

Descriptors: *Fuel cell, *Performance characteristics, *Reliability, *Test program, Acceptance, Cell, Characteristics, Corrosion, Evaluation, Fuel, Life, Load, Performance, Power, Program, Test, Thermal.

For abstract, see STAR 05 15.
N67-28786 HC$3.00 MF$0.65

SOLAR CELL COVER GLASS DEVELOPMENT QUARTERLY TECHNICAL PROGRESS REPORT, 1 SEP. - 30 NOV. 1966.
Ion Physics Corp., Burlington, Mass.
30 Nov 66, 28p NASA-CR-84839, QTPR-2
Contract NAS5-10236

Descriptors: *High vacuum, *Silicon oxide, *Solar cell, *Sputtering, *Thermal cycling, Cell, Cover, Cycling, Dioxide, Flux, Glass, High temperature, Integral, Irradiation, Oxide, Proton, Silicon, Slip, Solar, Test, Thermal.

For abstract, see STAR 05 15.
N67-28877 HC$3.00 MF$0.65

ANALYSIS OF RADIATION DAMAGE IN SILICON SOLAR CELLS AND ANNEALING OR COMPENSATION OF DAMAGE BY IMPURITIES FINAL REPORT, 7 JAN. 1964 - 21 APR. 1966.
Radio Corp. of America, Princeton, N. J.
N. Almeleh, B. Goldstein, P. Rappaport, and J. J. Wysocki. May 66, 22p NASA-CR-83860
Contract NAS5-9131

Descriptors: *Annealing, *Impurity, *Radiation effect, *Silicon, *Solar cell, Boron, Cell, Compensation, Damage, Doping, Effect, Electric, Electron, Lithium, Model, Paramagnetic, Property, Radiation, Resistance, Resonance, Solar.

For abstract, see STAR 05 15.
N67-28927 HC$3.00 MF$0.65

10B. POWER SOURCES

ELECTROCHEMISTRY OF FUEL CELL ELECTRODES. SURFACE OXIDATION OF GOLD ELECTRODES.
Technical memo., 16 Apr 62-15 Apr 65,
Tyco Labs., Inc., Waltham, Mass.
S. B. Brummer, and A. C. Makrides. Oct 63, 30p TM-6
Contract Nonr-3765 (00), ARPA Order-302-62

Descriptors: (*Fuel cells, Electrodes), (*Electrodes, Oxidation), (*Gold, Oxidation), Oxides, Oxidation-reduction reactions, Electrolytes, Perchlorates, Potentiometers analysis, Electrolytic cells.

The surface oxides formed on electropolished gold by potentiostatic anodization in the range 1.2 - 1.8 v vs. H (+)/H2 in the same solution, were studied by galvanostatic reduction at current densities between 10 and 1000 *microemperes/sq cm. Molar perchlorate solutions of pH 0.04 to 2.1 were employed. The extent of oxide formation is determined by the potential of anodization, the charge increasing linearly with the potential of formation in the range of 1.4 to 1.8 v. Cathodic chronopotentiograms show that reduction of the oxide occurs at a definite potential which depends on the cathodic current density. Current-potential curves, constructed from the chronopotentiograms, follow a Tafel relation with a slope of 41 mV. The exchange current for oxide reduction decreases with pH and with increasing potential of formation of the oxide. The electrochemical order of the reduction reaction is -1.65 with respect to pH. A mechanism for reduction is suggested in which it is assumed that the reduction of an intermediate (Au II) is the slow step in the overall process. (Author)
AD-423 991 HC$3.00

CONSTRUCTION OF STEADY-STATE HYDROMAGNETIC DYNAMOS. II. THE SPHERICAL CONDUCTOR,
New York Univ N Y Magneto-Fluid Dynamics Div
For primary bibliographic entry see Field 20I.
AD-653 603 HC$3.00 MF$0.65

INVESTIGATIONS OF MHD ACCELERATORS FOR WIND TUNNEL APPLICATIONS.
Siemens-schuckertwerke A. G., Erlangen (West Germany). Forschungslaboratorium.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 15.
N67-28802 HC$3.00 MF$0.65

10C. ENERGY STORAGE

LITHIUM-MOIST AIR BATTERY.
Semiannual rept. no. 2,
Globe-Union Inc Milwaukee Wis Applied Research Labs
Korge E. A. Toni, R. L. Zwaagstra, and William E. Elliott. Mar 67, 41p
Contract DA-44-009-AMC-1552 (T)
See also AD-642 248.

Descriptors: (*Storage batteries, *Lithium), (*Batteries + components, Electrochemistry), (*Electrodes, Air), (*Oxygen, Reduction (Chemistry)), Platinum, Electrolytes, Ammonium compounds, Phosphates, Nitroso compounds, Amines, Water, Moisture, Reaction kinetics, Oxidation-reduction reactions, Disproportionation, Peroxides, Hydroxides, Interactions, Surfaces, Electric propulsion, Power supplies.
Identifiers: Lithium-air batteries, Nitroso dimethylamines, Phenyltrimethyl ammonium hexafluorophosphates.

Work was directed toward the understanding of the mechanism of the oxygen reduction (air electrode) in nonaqueous media. The smooth platinum/O2 saturated phenyltrimethyl ammonium hexafluorophosphate-nitrosodimethylamine system was studied extensively. The effect of water on the kinetics was also included. The overall process of oxygen reduction is a complex mechanism which includes two main reduction steps. The first reduction step includes an ECE mechanism with disproportionation as a side complication. The ECE mechanism consists of the reduction of oxygen to peroxide with superoxide as an intermediate. The second step is very irreversible and possibly is the reduction of peroxide to hydroxide which can only occur when protons are available. Water (protons) plays an important role in all of the mechanism. Accumulation of oxygen on the electrode and interaction between O2 and Pt was also studied. (Author)
AD-653 774 HC$3.00 MF$0.65

HIGH ENERGY ELECTROCHEMICAL COUPLES. II. GAS ELECTRODES IN ORGANIC SOLVENTS.
Interim rept.,
American Univ Washington D C
R. T. Foley, and E. J. Taborek. Feb 67, 18p Rept no. 2
Contract DA-44-009-AMC-1386 (T)

Descriptors: (*Storage batteries, *Lithium), (*Batteries + components, Electrochemistry), (*Oxygen, Reduction (Chemistry)), Gases, Electrolytes, Organic solvents, Purification, Distillation, Electrolytic cells, Design, Construction, Electric propulsion, Power supplies.
Identifiers: Lithium-air batteries.

The purpose of the work is to provide basic information on selected electrochemical couples which may be useful in the development of electrochemical energy storage systems suitable for vehicle propulsion. A literature survey was made on the cathodic oxygen electrode in non-aqueous solvents and revealed that, while very little work on this reaction has been done, there exists a reversible one-electron reduction of oxygen in several

organic solvents. An attempt to purify the solvent by electrolysis was unsuccessful. A spinning band column was set up for fractional distillation. Electrochemical cells were designed and fabricated. (Author)
AD-653 779 HC$3.00 MF$0.65

HIGH ENERGY SYSTEM (ORGANIC ELECTROLYTE).
Quarterly rept., no. 3, 15 Dec 66-15 Mar 67,
Electric Storage Battery Co Yardley Pa Carl F Norberg Research Center
H. R. Buhner, and V. J. Spera. Jun 67, 54p Rept no. 7
ECOM-02304-3
Contract DA-28-043-AMC-02304 (E)
See also AD-648 920.

Descriptors: (*Storage batteries, Electrolytes), (*Electrolytes, Organic materials), (*Batteries + components, Organic materials), Lithium, Copper compounds, Fluorides, Organic solvents, Ureides, Organic sulfur compounds, Glycols, Concentration (Chemistry), Solubility, Lithium compounds, Perchlorates, Graphite, Purification, Cathodes (Electrolytic cell), Complex compounds, Ethylenediamine, Electric discharges, Reaction kinetics, Sulfites.
Identifiers: Lithium-cupric fluoride cells, Propylene glycol sulfites, Tetramethyl urea, Organic batteries.

Progress is described of work undertaken to improve the activated storage life, and to increase the current density capability of the Li/CuF2 cells. A continuing search was made for new electrolyte solvents in order to obtain an electrolyte with properties superior to those of LiClO4/propylene carbonate solutions. Tetramethylurea and 1,2-propylene glycol sulfite were investigated, and the organic sulfur compound was found to be promising. Methods for purifying graphite were investigated as a result of the observations that certain impurities were adversely affecting cathode performance on activated stand. Complexones were re-evaluated, and although it was found that ethylene diamine effected an improved activated stand for Li/CuF2 cells, the improvement was only marginal. Studies of CuF2 cathode discharge kinetics were continued and, it appears from the results obtained using chronopotentiometric techniques that the reaction is diffusion controlled in LiClO4/propylene carbonate solutions. (Author)
AD-653 785 HC$3.00 MF$0.65

EVALUATION OF ELECTROCHEMICAL ENERGY STORAGE SYSTEMS FOR VEHICLE PROPULSION.
Interim technical rept., 3 Mar-3 Dec 66,
Standard Oil Co (Ohio) Cleveland Research and Development Dept
R. A. Rightmire. 1 Mar 67, 43p
Contract DA-44-009-AMC-1531 (T)

Descriptors: (*Batteries + components, *Electrochemistry), Vehicles, Propulsion, Resistance (Electrical), Potassium compounds, Lithium compounds, Electrolytes, Chlorides, Electrolytic cells, Design, Cathodes, Tables, Energy, Weight, Computer programs.

The purpose of this contract is to evaluate the Sohio molten salt secondary battery for vehicle propulsion. The Sohio battery uses a molten lithium chloride-potassium chloride electrolyte, activatable carbon cathodes with special additives to increase capacity and lithium alloy anodes. Test results on Sohio cells indicate that a 100 WH/lb. battery is possible if a 50% improvement in cathode performance can be achieved, if a stable electrode spacer is developed which allows tighter unit cell packaging, if container and seal weights are reduced and if life of cathode is extended. (Author)
AD-653 790 HC$3.00 MF$0.65

DEVELOPMENT OF ELECTROCHEMICAL ENERGY STORAGE UNIT FOR VEHICLE PROPULSION.
Interim technical rept., 30 Jun-30 Dec 66,
Standard Oil Co (Ohio) Cleveland Research and Development Dept
R. A. Rightmire. 1 Apr 67, 66p
Contract DA-44-009-AMC-1843 (T)

Descriptors: (*Batteries + components, *Electrochemistry), Vehicles, Propulsion, Resistance (Electrical), Potassium compounds, Lithium compounds, Electrolytes, Chlorides, Electrolytic cells, Design, Cathodes, Tables, Energy, Weight, Computer programs.

The purpose of this work is to design and develop a 100 WH/lb. sealed molten salt secondary battery for vehicle propulsion. The Sohio battery uses a molten lithium chloride-potassium chloride electrolyte, activatable carbon cathodes containing special additives to increase capacity, and lithium alloy anodes. Research cells have been successfully built and tested but are below optimum design. Actual packaged units using low capacity cathodes have delivered 8 watt-hours/lb. in their present state of development. A preliminary design has been completed using high capacity research electrodes which indicates a 100 watt-hour/lb. battery is practical if more compact packaging can be achieved and if cycle life of the high capacity cathode can be extended at least tenfold. (Author)
AD-653 791 HC$3.00 MF$0.65

NON-AQUEOUS ELECTROLYTE SYSTEMS.
Interim rept.,
California Univ Los Angeles Dept of Engineering
Douglas N. Bennion, Neng Ping Yao, and Emmanuel D'Orsay. Jan 67, 49p Rept no. 1, 67-6
Contract DA-44-009-AMC-1661 (T)

Descriptors: (*Batteries + components, Electrolytes), (*Electrolytes, Organic materials), (*Sulfonates, Electrolytes), Sodium compounds, Halogenated hydrocarbons, Fluorine compounds, Lithium compounds, Perchlorates, Solvents, Electrical conductance, Melting point, Electric discharges, Eutectics, Heat of activation, Phase studies.
Identifiers: Fused salts, Lithium perchlorate, Organic batteries, Sodium trifluoromethane sulfonates.

The work includes preliminary experimental results on conductivity, melting point, and current-voltage measurements for sodium trifluoromethane sulfonate and mixtures with lithium perchlorate. This mixture appears to form a eutectic with a melting point of 190C at about 35 mole percent lithium perchlorate. The conductivity of this mixture is 0.13/Ohm/cm at 300C. Other solvents which are being considered are triethylamine trifluoromethyl sulfonate and ethyl ethylsulfonate along with some other sulfur containing esters. (Author)
AD-653 799 HC$3.00 MF$0.65

ADVANCED DEVELOPMENT MODELS OF SEALED NICKEL-CADMIUM BATTERIES.
Test rept.,
Eagle-Picher Industries Inc Joplin Mo Couples Dept
E. S. Carr, and H. H. LaFollette. Mar 67, 38p
ECOM-00070-T
Contract DA-28-043-AMC-00070 (E)

Descriptors: (*Alkaline cells, Performance (Engineering)), (*Batteries + components, Performance (Engineering)), Acceptability, Nickel, Cadmium, Electric discharges, Electrical properties, Vibration, Storage.
Identifiers: Nickel-cadmium cells.

Sixteen batteries each of BB-467/U, BB-468/U, BB-469/U, BB-470/U, BB-471/U and BB-472/U were subjected to the acceptance tests of Paragraph 4.3.1 of Specification SCL-6868B dated 12 Febrary 1964. Each battery type passed acceptance criteria. The design is deemed satisfactory based on performance during these tests. Cycle tests were performed as per Paragraph 4.11 of SCL-6868B. The tested batteries of all types demonstrated the required discharge capacity after 1008 cycles of 61.5% depth. (Author)
AD-654 057 HC$3.00 MF$0.65

STANDARD LINE-BATTERY ASSEMBLY BB-610 ()/U NICKEL CADMIUM VENTED.
Final rept., 29 Apr 66-17 Jan 67,
Sonotone Corp Elmsford N Y
R. Nathe, and J. Herrmann. Jun 67, 151p
ECOM-01508-F
Contract DA-28-043-AMC-01508 (E)
See also AD-637 156.

Descriptors: (*Storage batteries, Design), Glass textiles, Containers, Nickel, Cadmium, Environmental tests, Mechanical drawings, Data.

The report covers the concluding research and development activities which have been directed toward the design of a 12-volt, 14 A.H., Nickel-Cadmium, vented battery housed in a fiberglas case. This report attests that the contracted battery has met all the requirements of the applicable specifications. For the results of certain environmental tests, Sonotone has supplied their certified test data sheets. For the results of acceleration, bounce, and vibration, United Aerotest Inc. has supplied their own test data. Included in the report are the battery's official parts list, listed in order of parts breakdown, and accompanied by page-size assembly drawings of all battery parts. Overall conclusions and recommendations are given concerning the program and ideas are submitted for consideration on any similar future programs. (Author)
AD-654 130 HC$3.00 MF$0.65

RESEARCH INTO FUNDAMENTAL PHENOMENA ASSOCIATED WITH SPACECRAFT ELECTROCHEMICAL DEVICES - CALORIMETRY OF NICKEL-CADMIUM CELLS PROGRESS REPORT, 1 OCT. 1966 - 31 DEC. 1966.
American Univ., Washington, D. C.
R. T. Foley, and W. H. Webster. Dec 66, 37p
NASA-CR-84809, PR-2
Contract NAS5-10105

Descriptors: *Electrochemical cell, *Nickel-cadmium battery, *Spacecraft power supply, Battery, Cadmium, Cell, Charge, Control, Cycling, Efficiency, Electrochemical, Electrode, Nickel, Power, Pressure, Spacecraft, Supply, Transducer.

For abstract, see STAR 05 15.
N67-28773 HC$3.00 MF$0.65

11. MATERIALS

11A. ADHESIVES AND SEALS

MILITARY APPLICATIONS OF PLASTICS AND RELATED MATERIALS,
Plastics Technical Evaluation Center Dover N J
For primary bibliographic entry see Field 11I.
AD-653 837 HC$3.00 MF$0.65

11B. CERAMICS, REFRACTORIES, AND GLASSES

MICROSTRUCTURE STUDIES OF POLYCRYSTALLINE REFACTORY OXIDES.
Summary rept., 25 Mar 66-24 Apr 67,
Avco Missiles Space and Electronics Group Lowell Mass Avco Space Systems Div

A. H. Heuer, W. H. Rhodes, D. J. Stellers, and T. Vasilos. Apr 67, 119p
Contract NOw-66-0506

Descriptors: (*Refractory materials, Microstructure), (*Alumina, Preparation), (*Magnesium oxides, Preparation), Powders, Handling, Analysis, Material forming, Recrystallization, Nucleation, Deformation, Dislocations, Tensile properties, Ductility, Optical properties, Hot working, Press forging.

Hot working polycrystalline alumina, utilizing a press forging technique, was extensively investigated. Primary recrystallization followed the working and resulted in either single crystals (strain-anneal technique) or relatively fine-grained structures. The basal texture present after recrystallization was identical to the deformation texture; this and the equiaxed recrystallized structures suggested that oriented nucleation was important. At larger grain sizes, an elongated grain structure was observed and was attributed to oriented growth. The marked basal texture suggested that basal slip was the predominant deformation mode; the probability of other deformation mechanisms was also discussed. Addition of 1/4% MgO retarded recrystallization and a number of such samples, possessing a pronounced basal deformation texture, were used for mechanical properties determination. The working led to no less of structural integrity, and the strength was surprisingly constant with grain size, at least in the range 3.5-10.5 microns. The larger-grained worked samples were stronger than hot-pressed samples of equivalent porosity and grain size. The high ductility, up to 75% height reduction being achieved without much difficulty, suggested that hot working could be used to produce shaped bodies. (Author)
AD-653 483 HC$3.00 MF$0.65

CERTAIN CHARACTERISTICS OF A HIGH-FREQUENCY INDUCTION GAS DISCHARGE AND PECULIARITIES OF ITS APPLICATION FOR SYNTHESIS OF REFRACTORY DIELECTRIC CRYSTALS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-653 556 HC$3.00 MF$0.65

BERYLLIDE COMPOSITION 1 2400-DEGREE TURBINE/MATERIALS RESEARCH PROGRAM.
Summary test rept.,
Garrett Corp Phoenix Ariz Airesearch Mfg Div
R. B. Scott. 17 Jan 67, 78p Rept no. MP-5242-R
Contract DA-44-177-AMC-183 (T)

Descriptors: (*Beryllium compounds, *Heat-resistant materials), Tensile properties, Impact tests, Stresses, Thermal expansion, Rupture, Corrosion resistance, Specific heat, Thermal stresses, Oxidation, Physical properties, Tables, Elasticity, Turbine parts, Creep, Thermal conductivity.
Identifiers: Beryllide Composition 1.

The report summarizes the results of tests conducted on beryllide Composition 1 specimens during performance of the 2400-degree turbine/materials research program. The information contained herein is intended for presentation to U. S. Army Aviation Materiel Laboratories to show compliance with Contract DA44-177-AMC-183 (T). The tests conducted include tensile, impact, stress-rupture, creep, thermal fatigue, oxidation, oxidation-sulfidation, and physical properties tests. (Author)
AD-653 632 HC$3.00 MF$0.65

SEMICONDUCTING GLASSES.
Rensselaer Polytechnic Inst Troy N Y
For primary bibliographic entry see Field 20L.
AD-653 714 Not available from CFSTI.

RELATION OF MECHANICAL PROPERTIES TO THE STRUCTURE OF IONIC SOLIDS.
Pennsylvania State Univ University Park Materials Research Lab
For primary bibliographic entry see Field 20B.
AD-653 788 HC$3.00 MF$0.65

THE PREPARATION AND STRUCTURE OF ZIRCONIA SPHERES,
Mcmaster Univ Hamilton (Ontario) Dept of Metallurgy and Metallurgical Engineering
For primary bibliographic entry see Field 11G.
AD-653 833 Not available from CFSTI.

THE THERMODYNAMICS OF THE MAGNESIUM SILICATE/MAGNESIUM-SILICON-OXYGEN VAPOR SYSTEM,
Rand Corp Santa Monica Calif
F. J. Krieger. Apr 67, 51p Rept no. RM-5337-PR
Contract F44620-67-C-0045

Descriptors: (*Ablation, Thermodynamics), (*Magnesium compounds, Thermodynamics), (*Silicates, Thermodynamics), Magnesium, Silicon, Oxygen, Vapors, Thermal properties, Chemical equilibrium, Volume, Molecular weight, Density, Enthalpy, Energy, Entropy, Fluid mechanics, Tables, Diagrams, Magnesium oxides, Silicon dioxide.
Identifiers: Magnesium silicate, Ablative materials.

The thermodynamic properties of magnesium silicate were investigated over a range of temperatures up to 6000K and pressures up to 1000 atmospheres. Three sets of equilibrium composition equations were used--one representing a pure gas phase, the second a heterogeneous system of gas and condensed magnesia, and the third a heterogeneous system of gas and condensed magnesia and silica. Tabulated summaries give computed values of volume, molecular weight, moles of gas, moles of solid or liquid magnesia and silica, density, enthalpy, energy, and entropy for magnesium silicate at various temperatures and pressures. A conventional Mollier diagram is included in which specific enthalpy is plotted against specific entropy, with cross plots of temperature, pressure, and molecular weight or moles of condensed magnesia and silica. The variation of sublimation temperature with pressure is also shown for magnesia and silica both alone and in the presence of each other. (Author)
AD-653 925 HC$3.00 MF$0.65

THERMODYNAMICS OF VAPORIZATION IN THE ALUMINUM OXIDE-BORON OXIDE SYSTEM,
Little (Arthur D) Inc Cambridge Mass
For primary bibliographic entry see Field 7D.
AD-654 059 Not available from CFSTI.

UNRESOLVED PROBLEMS IN BRITTLE MATERIAL DESIGN: A CRITICAL LITERATURE REVIEW,
Advisory Group for Aerospace Research and Development Paris (France)
W. H. Dukes. May 66, 32p Rept no. AGARD Advisory-2
NATO Furnished.

Descriptors: (*Brittleness, State-of-the-art reviews), (*Refractory materials, Brittleness), Design, France, Fracture (Mechanics), Statistical analysis, Stresses, Test methods, Theory, Structural properties, Bibliographies.

Extensive benefits are to be derived from the employment of certain non-metallic refractory materials in structural applications, particularly where severe operating temperatures are involved. These materials, however, lack ductility and are susceptible to flaws, so that conventional design procedures cannot be used with confidence that a reliable structure will result. In view of the interest in the use of these materials the Panel has therefore embarked upon a programme to appropriately refine design procedures and techniques, and to present the resulting material in a form convenient for use by designers. This critical literature review is an early result of this programme. (Author)
AD-654 119 HC$3.00 MF$0.65

COMPATIBILITY OF BIAXIALLY STRESSED D-43 ALLOY WITH REFLUXING POTASSIUM.
General Electric Co., Cincinnati, Ohio. Missile and Space Div.
R. W. Harrison. Jun 67, 45p NASA-CR-807
Contract NAS3-6012

Descriptors: *Liquid potassium, *Niobium alloy, *Refractory alloy, *Stress corrosion, Alloy, Capsule, Corrosion, Creep, Effect, Liquid, Niobium, Potassium, Refractory, Stress, Temperature, Test, Time, Vapor, Welding.

For abstract, see STAR 05 15.
N67-28748 HC$3.00 MF$0.65

11C. COATINGS, COLORANTS, AND FINISHES

A STUDY OF THE OPERATING LIMITS OF THE STANNATE IMMERSION BATH.
Army Coating and Chemical Lab Aberdeen Proving Ground Md
For primary bibliographic entry see Field 13H.
AD-653 572 HC$3.00 MF$0.65

FEASIBILITY OF USING FLUORESCENT COLORANTS TO AFFORD CAMOUFLAGE PROTECTION AGAINST PHOTOGRAPHIC DETECTION,
Army Natick Labs Mass Clothing and Organic Materials Div
Alvin O. Ramsley, and John T. Walwood. Oct 66, 25p Rept no. C/OM-TS-145
USA-NLABS-TR-67-26-CM

Descriptors: (*Infrared photography, Camouflage), (*Camouflage, *Fluorescence), (*Dyes, Fluorescence), Textiles, Protective clothing, Feasibility studies, Selection, Infrared detectors, Reflectivity, Band spectrum, Substrates, Quenching (Inhibition), Coloring.

Camouflage against visual observation or detection by infrared image-converters requires that the reflectance of objects be relatively low. On the other hand, camouflage against infrared-sensitive photography requires that reflectance in the appropriate spectral region be relatively high. Reasons for these restrictions are discussed. Of possible approaches to attain desired reflectance characteristics, that involving fluorescence in the near infrared is discussed. A methodology for searching for suitable dyes and the design of an instrument that can identify the invisible infrared fluorescence are described. The infrared fluorescence characteristics of over 100 dyes applied to various fabrics is given. (Author)
AD-653 604 HC$3.00 MF$0.65

IMPROVEMENT OF TEAR RESISTANCE OF COATED FABRICS.
Melpar Inc Falls Church Va
For primary bibliographic entry see Field 11E.
AD-653 792 HC$3.00 MF$0.65

PROTECTION OF MOORING BUOYS. PART IX. RESULTS OF EIGHTH RATING INSPECTION.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 13J.
AD-654 173 HC$3.00 MF$0.65

HIGH TEMPERATURE PROTECTIVE COATINGS FOR REFRACTORY METALS PROGRESS REPORT, 21 JAN. - 21 APR. 1967.
Union Carbide Corp., Parma, Ohio. Carbon Products Div.
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 15.
N67-28788 HC$3.00 MF$0.65

LIST OF PUBLICATIONS ON FIRE PERFORMANCE.
Forest Products Labs., Madison, Wis.
For primary bibliographic entry see Field 11L.
PB-174 845 HC$3.00 MF$0.65

11D. COMPOSITE MATERIALS

EFFECT OF CYCLE PROFILE ON THE BIAXIAL COMPRESSIVE FATIGUE PERFORMANCE OF FILAMENT WOUND LAMINATES.
Technical summary rept.,
IIT Research Inst., Chicago, Ill.
B. W. Abbott, R. H. Cornish, and C. K. Cole. Jan 65, 90p
Contract NObs-90329

Descriptors: (*Filament wound construction, Fatigue (Mechanics)), (*Reinforced plastics, Fatigue (Mechanics)), Compressive properties, Non-destructive testing, Ultrasonic radiation, Stresses, Composite materials, Laminated plastics, Pressure vessels, Deep submergence, Epoxy plastics, Structural properties.

The results of a program to study the effect of cycle profile on the biaxial compressive fatigue performance of glass reinforced plastics is presented. A description of the materials used, and methods of specimen fabrication and preparation is included. The results of specimen characterization as well as the techniques employed for ultrasonic inspection of the finished specimens are discussed. The results of biaxial compressive fatigue experiments, aimed at (a) establishing the effect of cycle profile, and (b) studying fatigue effects at low stress levels, are presented and discussed. Some observations of fatigue damage sites in unfailed specimens by macroscopic inspection of specimen cross sections is included. A literature review of the effect of frequency on the fatigue strength of metallic materials is presented in an appendix. An analysis of the ultrasonic inspection records obtained during the course of the study is also included as an appendix. (Author)
AD-456 011 HC$3.00

MECHANICAL PROPERTIES AND BONDING EFFICIENCY OF STEEL COMPOSITES,
Army Materials Research Agency Watertown Mass
For primary bibliographic entry see Field 11F.
AD-653 545 HC$3.00 MF$0.65

SHEAR MODULUS DETERMINATION IN LAMINATED COMPOSITE MATERIALS.
Technical rept., Jul-Sep 66,
Air Force Materials Lab Wright-Patterson AFB Ohio
James M. Whitney. Mar 67, 20p Rept no. AFML-TR-67-22

Descriptors: (*Laminates, Test methods), (*Composite materials, Test methods), Shear stresses, Structural shells, Reinforcing materials, Reinforced plastics, Elasticity, Strain (Mechanics).

The report discusses limitations on two widely used methods of measuring shear modulus of fiber reinforced composites. In particular, it is shown that for certain types of fiber lay-ups neither a plate twisting test nor a torsion tube can be used to measure shear modulus directly. Classical theory of laminated plates and cylindrical shells of the Donnell type provides the basis for these conclusions. Circumstances under which these tests can be used to measure shear modulus directly are also discussed. (Author)
AD-653 590 HC$3.00 MF$0.65

THE WATER ABSORPTION OF AN UNSATURATED POLYESTER RESIN AND GLASS-FIBRE/RESIN COMPOSITES.
Royal Aircraft Establishment Farnborough (England)
For primary bibliographic entry see Field 11I.
AD-653 692 HC$3.00 MF$0.65

STRAINS AND STRESSES IN MATRICES WITH INSERTS,
Catholic Univ of America Washington D C School of Engineering and Architecture
For primary bibliographic entry see Field 20K.
AD-653 721 HC$3.00 MF$0.65

MECHANICAL BEHAVIOR OF FIBER-REINFORCED COMPOSITE MATERIALS.
Annual rept. no. 2, Dec 65-Dec 66,
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
Donald F. Adams, Douglas R. Doner, and Rodney L. Thomas. May 67, 150p Rept no. U-4093 AFML-TR-67-96
Contracts AF 33 (615)-5198, AF 33 (615)-2180

Descriptors: (*Composite materials, *Mechanical properties), Reinforcing materials, Laminates, Shear stresses, Fibers (Synthetic), Epoxy plastics, Fatigue (Mechanics), Glass textiles, Stresses, Mathematical analysis, Equations, Boron, Elasticity, Computer programs, Tables, Compressive properties, Tests.

It is generally agreed that a unidirectional composite is the fundamental unit from which composite structures are constructed. By subjecting this material to three separate loading conditions, that is, axial, transverse, and shear loadings, the basic stiffness and strength properties of the composite can be predicted in terms of the material and geometric properties of the constituents. These 'micromechanics' analyses are presented, along with a detailed presentation of numerical results and a discussion of their practical significance. Analytical results have been compared with other analyses and with experimental data generated during this investigation. In addition, a preliminary discussion is given to the cyclic fatigue behavior of unidirectional composites. An S glass-epoxy system has been utilized in tests to date. Properties of boron-epoxy composites, including cross-ply and angle-ply laminates subjected to uniaxial tension, have been experimentally determined and results compared with analytical predictions. The satisfactory agreement obtained supports the assumption that the analysis, orginally verified for glass-epoxy composites, is equally valid for boron-epoxy systems. (Author)
AD-654 056 HC$3.00 MF$0.65

STRESSES FROM STRAINS ON WOVEN-ROVING, FIBER-GLASS-REINFORCED PLASTIC.
Research and Development rept.,
Naval Ship Research and Development Center Annapolis Md Annapolis Div
Edwin M. Petrisko. Jun 67, 27p
NSRDC-2426

Descriptors: (*Reinforced plastics, Glass textiles), (*Stresses, Reinforced plastics), Laminated plastics, Loading (Mechanics).

Stress-strain relationships were developed to permit changing strain-gage readings taken on loaded woven-roving, fiber-glass-reinforced plastic. The reinforced-plastic laminate is one in which the mechanical properties vary with direction and cannot be considered constant in the standard strain-gage rosette equations. The equations developed permit a simple solution of stresses for materials whose directional properties do not vary drastically. (Author)
AD-654 164 HC$3.00 MF$0.65

11E. FIBERS AND TEXTILES

IMPROVEMENT OF TEAR RESISTANCE OF COATED FABRICS.
Final technical rept., 3 Feb 66-1 Feb 67,
Melpar Inc Falls Church Va
B. S. Fisher. Feb 67, 48p
Contract DA-44-009-AMC-1487 (T)

Descriptors: (*Nylon, Tensile properties), (*Organic coatings, *Elastomers), Bonding, Impregnation, Synthetic rubber, Phenols, Formaldehyde, Mechanical properties, Dip coating, Aging (Materials).

A series of 2 oz/sq yd, plain-weave nylon fabrics of varying thread count and degree of yarn twist impregnated with varying amounts of two standard primer-adhesive formulations were mechanically tested to determine the relative importance of fabric construction and primer compound variables in tear strength retention of coated fabrics. Primer modulus, amount of primer deposited and degree of yarn twist were found to be important initially. The loss of tear strength of the primer-treated fabrics was found to be due mainly to the immobilization of the fabric yarns by virtue of the bonding action of the primer compound at their points of intersection. The strength of this bond appeared to be a direct measure of the restraining force responsible for the yarn immobilization and was determined by means of a yarn pullout test developed for this purpose. The degree of restraint necessary to cause loss of fabric tear strength was found to be quite small. The additional restraint imposed by subsequent application of coating compound to the fabrics in a manner which allowed complete penetration was so great as to overshadow all other effects, even when the coating compound modulus was minimized by undercuring, and coating adhesion was low. Good tear strength retention at a low rate of tear was achieved with a composite coating embodying a modulus gradient, such that uncured elastomer filled the fabric interstices. (Author)
AD-653 792 HC$3.00 MF$0.65

11F. METALLURGY AND METALLOGRAPHY

SECOND-ORDER ELONGATION OF METAL TUBES IN CYCLIC TORSION.
Columbia Univ New York Inst for the Study of Fatigue and Reliability
For primary bibliographic entry see Field 20K.
AD-653 469 HC$3.00 MF$0.65

THE STRUCTURES OF THE Bi-Sn, Bi-Pb AND Bi-Tl EUTECTICS,
Toronto Univ (Ontario) Dept of Metallurgy and Materials Science
H. W. Kerr, and W. C. Winegard. 1967, 11p
Grant DRB-9535-01
Availability: Published in Canadian Metallurgical Quarterly v6 n1 p55-65.

Descriptors: (*Eutectics, *Bismuth alloys), Tin alloys, Lead alloys, Thallium alloys, Dendritic structure, Microstructure.

The structures of the Bi-Sn, Bi-Pb and Bi-Tl eutectic composition alloys and alloys close to the eutectic composition have been studied as a function

of the growth conditions. An attempt has been made to explain the structures and to compare them with existing theories. (Author)
AD-653 488 Not available from CFSTI.

CHEMICAL AND CHEMICAL TECHNOLOGY, VOL. 16 PART II, 1963, TRANSACTIONS: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7A.
AD-653 504 HC$3.00 MF$0.65

MECHANICAL PROPERTIES AND BONDING EFFICIENCY OF STEEL COMPOSITES,
Army Materials Research Agency Watertown Mass
Charles F. Hickey, Jr. May 67, 19p Rept no. AMRA-TR-67-12

Descriptors: (*Steel, Mechanical properties), (*Composite materials, Bonding), (*Armor, Composite materials), Efficiency, Alloys, Ballistics, Tensile properties, Hardness, Bending.

The investigation concerns a study of the mechanical properties and bonding efficiency of steel composites. Tensile, slow bend, and hardness data are reported for several alloy combinations. Bonding efficiency of the composite materials, as defined by the tension and slow bend tests, are correlated with ballistic performance results. Results of the program indicate that excellent agreement exists between the tension and slow bend tests as to the quality of the interface bond. These results also correlated well with those obtained from the ballistic tests. Thus, it can be concluded that the tension and slow bend tests can be used as screening tools to define the delamination tendency of steel composites. (Author)
AD-653 545 HC$3.00 MF$0.65

A STUDY OF THE OPERATING LIMITS OF THE STANNATE IMMERSION BATH.
Army Coating and Chemical Lab Aberdeen Proving Ground Md
For primary bibliographic entry see Field 13H.
AD-653 572 HC$3.00 MF$0.65

ADHESIVE BONDING OF STAINLESS STEELS.
Technical memo.,
Battelle Memorial Inst Columbus Ohio
R. E. Keith, M. D. Randall, and D. C. Martin. 16 Feb 67, 125p
NASA-TM-X-53574
Contract DA-01-021-AMC-11651 (Z)

Descriptors: (*Stainless steel, *Bonding), (*State-of-the-art reviews, *Bonded joints), Adhesives, Surfaces, Preparation, Environment, Selection, Performance (Engineering).

The report covers the state of the art of adhesive bonding of stainless steels. Typical joint designs, surface preparation procedures, and environmental factors are described as they influence choice among the available adhesives and processing techniques. Both organic and inorganic adhesives are covered.
AD-653 576 HC$3.00 MF$0.65

DEFORMATION PROCESSING OF STAINLESS STEEL.
Battelle Memorial Inst Columbus Ohio
For primary bibliographic entry see Field 13H.
AD-653 577 HC$3.00 MF$0.65

NONDESTRUCTIVE EVALUATION OF METAL FATIGUE.
Southwest Research Inst San Antonio Tex Dept of Instrumentation Research
For primary bibliographic entry see Field 20K.
AD-653 587 HC$3.00 MF$0.65

THE DEFORMATION BEHAVIOR OF ISOAXIAL BICRYSTALS OF Fe-3% Si.
Doctoral thesis,
Aerospace Research Labs Wright-Patterson AFB Ohio
R. E. Hook, and J. P. Hirth. 22 Jun 66, 22p Rept no. ARL-67-0072
Availability: Published in Acta Metallurgica v15 p535-51 Mar 1967.

Descriptors: (*Iron alloys, Deformation), (*Metallic crystals, Dislocations), (*Dislocations, Iron alloys), Silicon alloys, Strain (Mechanics), Etched crystals, Grain boundaries, Elasticity, Anisotropy, Single crystals.
Identifiers: Iron alloy 3Si.

The slip occurring in bicrystals of a high purity Fe-3%Si alloy subjected to small plastic strains by deformation in compression was investigated using etch pitting techniques. Four isoaxial types of bicrystals, each containing a planar boundary parallel with the compression axis, were studied. The deformation behavior is examined in terms of the compatibility requirements imposed at the grain boundary plane and the effect of elastic anisotropy on the mutual interaction between crystals. Elastic incompatibility at the grain boundary plane is found to give rise to local stresses which result in the operation of secondary slip systems not normally expected to be operative in the individual single crystal components. (Author)
AD-653 657 Not available from CFSTI.

CHEMICAL PHYSICS OF SURFACE REACTIONS OF METALS.
Final rept., 1 Jun 65-31 May 67,
Westinghouse Research Labs Pittsburgh Pa
Earl A. Gulbransen, and Richard L. Tallman. 31 May 67, 127p Rept no. 67-9B6-SURFC-R1
Contract Nonr-4949 (00)

Descriptors: (*Iron, Oxidation), (*Iron oxides, *Crystal growth), (*Single crystals, Iron oxides), (*Whiskers (Crystals), Iron oxides), Metals, Surfaces, Corrosion, Twinning (Crystallography), Electron diffraction analysis, Electron microscopy, Transport properties, Thermochemistry, Nucleation, Dislocations.

A survey is made of studies at the Westinghouse Research Laboratories on the structure of oxide films and the formation of localized oxide growths on iron. Filamentary whisker growths are formed when iron is oxidized in dry oxygen at 400 to 500C. Long, blade-like platelets are formed at 450C in atmospheres containing both water vapor and a trace of oxygen. The oxide whiskers and the blade-like platelets produce fiber-texture patterns showing exclusively alpha-Fe2O3 diffraction. Selected-area electron diffraction patterns of individual growths indicate (1) that the most simple whiskers have a single axial screw dislocation and (2) that the blades are twinned on the blade-face plane. Growth mechanisms based on easy paths for diffusion along the axial dislocation in the oxide whisker and along the twin plane in the oxide blade-like platelet are proposed. Some calculations relevant to the internal diffusion mechanism in whiskers are presented. (Author)
AD-653 723 HC$3.00 MF$0.65

SEPARATION OF VANADIUM, ZIRCONIUM, TITANIUM, MOLYBDENUM, TUNGSTEN, AND COLUMBIUM BY ELUTION DEVELOPMENT ION EXCHANGE CHROMATOGRAPHY.
Technical rept.,
Army Materials Research Agency Watertown Mass
Thomas A. Ferraro. Apr 67, 36p Rept no. AMRA-TR-67-10

Descriptors: (*Refractory metal alloys, *Chromatographic analysis), (*Niobium alloys, Chromatographic analysis), (*Vanadium, Ion exchange), (*Zirconium, Ion exchange), (*Titanium, Ion exchange), (*Molybdenum, Ion exchange), (*Tungsten, Ion exchange), Adsorption, Inorganic acids, Hydrogen compounds, Fluorides, Niobium, Distribution, Separation, Equations, Ion exchange resins.
Identifiers: Hydrogen fluoride.

The elution behavior of vanadium, zirconium, titanium, molybdenum, tungsten, and columbium was studied at various hydrolfluoric acid concentrations employing a strong base anion exchange resin. The results of this study were used to establish appropriate separation schemes. Coupled columns were employed for the separation of the complete group. Simple columns were used for less complicated mixtures. Vanadium, zirconium, titanium, and molybdenum were eluted with appropriate hydrofluoric acid solutions. In this way, interference from large amounts of columbium was avoided. An 'interval' equation defining the desired volume interval between successively eluting solutes is offered for calculating the column length required for a particular separation. This equation is especially useful for determining the extent to which a column must be lengthened when overlapping occurs due to high column loading. (Author)
AD-653 767 HC$3.00 MF$0.65

ION EXCHANGE ANALYSIS OF COLUMBIUM ALLOYS.
Technical rept.,
Army Materials Research Agency Watertown Mass
Thomas A. Ferraro. Jun 67, 25p Rept no. AMRA-TR-67-17

Descriptors: (*Refractory metal alloys, *Chromatographic analysis), (*Niobium alloys, Chromatographic analysis), (*Hafnium, Ion exchange), (*Tantalum, Ion exchange), (*Titanium, Ion exchange), (*Tungsten, Ion exchange), (*Vanadium, Ion exchange), (*Zirconium, Ion exchange), Absorption, Inorganic acids, Hydrogen compounds, Fluorides, Separation, Resolution, Gravimetric analysis, Volumetric analysis, Colorimetric analysis.
Identifiers: Hydrogen fluoride.

An ion-exchange method developed at AMRA (see AD-653 767) was applied to the analysis of synthetic mixtures representing various columbium-base alloys. The alloying elements which were separated and determined include vanadium, zirconium, hafnium, titanium, molybdenum, tungsten, and tantalum. Mixtures containing zirconium or hafnium, tungsten, tantalum, and columbium were separated by means of a single, short column. Coupled columns were employed for the resolution of mixtures containing vanadium, zirconium or titanium, molybdenum, tungsten, and columbium. The separation procedures and the methods employed for the determination of the alloying elements in their separate fractions are described. (Author)
AD-653 768 HC$3.00 MF$0.65

THE SOLID STATE CHEMISTRY OF HYDROGEN COMPOUNDS.
Arizona State Univ Tempe Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-653 891 HC$3.00 MF$0.65

A STUDY OF THE NIOBIUM (110) SURFACE USING LOW ENERGY ELECTRON DIFFRACTION TECHNIQUES,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20B.
AD-653 899 Not available from CFSTI.

STACKING FAULT ENERGIES OF THE STRUCTURALLY RELATED Cu-Ga ALPHA AND ZETA PHASES.

Mellon Inst Pittsburgh Pa
For primary bibliographic entry see Field 20B.
AD-653 905 Not available from CFSTI.

APPLICATION OF MICROFRACTOGRAPHY TO THE STUDY OF CRACK PROPAGATION UNDER FATIGUE STRESSES,
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 20K.
AD-653 918 HC$3.00 MF$0.65

ON THE NATURE OF MASSIVE PHASES IN HYPOEUTECTOID Cu-Ga ALLOYS,
Mellon Inst Pittsburgh Pa
K. H. G. Ashbee, L. F. Vassamillet, and T. B. Massalski. 20 Apr 66, 10p
AFOSR-67-1415
Grant AF-AFOSR-929-65
Availability: Published in Acta Metallurgica v15 p181-7 Feb 1967.

Descriptors: (*Copper alloys, Phase studies), Gallium alloys, Eutectics, Transformations, Electron microscopy, Dislocations, Crystal lattice defects, Grain structures (Metallurgy).

Five hypoeutectoid copper-gallium alloys that undergo a massive transformation on cooling have been investigated by electron microscopy. It is shown that in addition to dislocations and stacking faults the massive phases contain areas of highly striated regions and that these regions may consist of a duplex structure involving f.c.c. and h.c.p. phases. The possibility that this structure is produced by growth or by a martensitic mechanism is discussed. Some details are given also of the f.c.c. structure that is produced by deformation and annealing of the equilibrium h.c.p. phase. (Author)
AD-654 120 Not available from CFSTI.

STRESS-CORROSION CRACKING RESISTANCE OF AN 18Ni 200 GRADE MARAGING STEEL BASE PLATE AND WELD.
Memorandum rept.,
Naval Research Lab Washington D C
G. Sandoz, and R. L. Newbegin. Mar 67, 13p
Rept no. NRL-MR-1772
ARPA Order-878

Descriptors: (*Maraging steels, Stress corrosion), (*Welds, Maraging steels), Cracks, Fracture (Mechanics), Nickel alloys, Titanium alloys.

The stress-corrosion cracking resistance in salt water of a welded 18Ni 200 grade maraging steel weldment was investigated. Unexpectedly, the weld metal was found to be more resistant to stress-corrosion cracking than the base plates. (Author)
AD-654 161 HC$3.00 MF$0.65

THERMAL PROPERTIES OF GOLD-SILICON BINARY ALLOY NEAR THE EUTECTIC COMPOSITION.
Technical rept.,
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
H. S. Chen, and D. Turnbull. May 67, 24p Rept no. TR-522
Contract Nonr-1866 (50)

Descriptors: (*Thermal properties, *Gold alloys), (*Silicon alloys, Thermal properties), Specific heat, Enthalpy, Liquid metals, Alloys, Entropy, Supercooling, Heat of fusion, Stability, Eutectics, Crystallization, Phase studies, Melting point, Intermetallic compounds, Heat of reaction, X-ray diffraction analysis, Tables, Equations.

We have measured the specific heat, CP, and the enthalpy of Au-18.6 at % Si alloy in some of its various forms. CP of the liquid form falls continuously with increasing temperature from 8.38 plus or minus 0.05 at 563K, corresponding to an undercooling of 73K, to 7.90 plus or minus 0.05 cal/gfw-K and it exhibits no singular behavior at the melting temperature, Tm. It exceeds the heat capacity of the eutectic solid by 1.87 cal/gfwK at Tm. This high specific heat in the liquid state and its decrease with increasing temperature is attributed principally to the configurational entropy as has been suggested for the pure liquid metals. CP of the amorphous alloy, formed by rapidly chilling the liquid, was measured for the temperature range from 208 to 278K. It rises slowly to 225K, then falls, and then rises again with increasing temperature. It exceeds CP of the eutectic solid by 0.2 to 0.4 cal/gfw-K. CP of the metastable intermetallic crystalline phase, formed when the liquid is less rapidly chilled, falls between the values for the eutectic and amorphous solids. The especially deep lying eutectic exhibited by this system is attributed to the tendency for unlike atoms to associate when in the metallic state, in contrast with the strong tendency for phase separation in the solid state owing to the high stability of silicon in its covalent crystalline form. (Author)
AD-654 167 HC$3.00 MF$0.65

THERMAL EVIDENCE OF A GLASS TRANSITION IN GOLD-SILICON-GERMANIUM ALLOY.
Technical rept.,
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
H. S. Chen, and D. Turnbull. May 67, 14p Rept no. TR-528
Contract Nonr-1866 (50)

Descriptors: (*Thermal properties, *Gold alloys), (*Silicon alloys, Thermal properties), (*Germanium alloys, Thermal properties), Crystallization, Liquid metals, Alloys, Heat of fusion, Glass, High-temperature research, Transition temperature, Entropy, Equilibrium, Metallic textiles, Phase studies, Stability, Melting point, Equations.

The specific heat of a 'splat' formed amorphous alloy of gold-silicon-germanium exhibits a very steep rise with increasing temperature near 295K to a peak and then begins to fall before crystallization occurs. These last Cp values fall on a reasonable extrapolation of the high temperature Cp - T relation found for the liquid alloy. These results are attributed to a glass liquid transition in this metal system. (Author)
AD-654 168 HC$3.00 MF$0.65

MONEL AND NICKEL CORROSION IN NONAQUEOUS NO2-HF SOLUTIONS,
Brookhaven National Lab., Upton, N. Y.
For primary bibliographic entry see Field 7A.
For abstract, see NSA 21 13.
BNL-50007 HC$3.00 MF$0.65

DESIGN AND FABRICATION OF A PHOTOTYPE LAMINATED URANIUM METAL SHIPPING CASK FOR LARGE SHIPMENTS OF CO,
Paducah Gaseous Diffusion Plant, Ky.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 13.
KY-521 HC$3.00 MF$0.65

ROLLING STUDIES OF URANIUM RODS AND TUBES,
National Lead Co., Cincinnati, Ohio.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 21 13.
NLCO-990 HC$3.00 MF$0.65

SUMMARY TECHNICAL REPORT FOR THE PERIOD JANUARY 1, 1967-MARCH 31, 1967,
National Lead Co., Cincinnati, Ohio.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 21 13.
NLCO-996 HC$3.00 MF$0.65

SOME EFFECTS OF TEMPERATURE AND FREQUENCY ON THE DEFORMATION AND FATIGUE RUPTURE BEHAVIOUR OF H46.
National Gas Turbine Establishment, Pyestock (England).
G. P. Tilly. Jan 66, 49p NGTE-R-278

Descriptors: *Chromium steel, *Deformation, *Martensitic steel, *Metal fatigue, *Rupture, Chromium, Creep, Cycling, Effect, Fatigue, Frequency, Martensite, Steel, Stress, Temperature.

For abstract, see STAR 05 15.
N67-27792 HC$3.00 MF$0.65

STRESS CORROSION CRACKING OF TITANIUM ALLOYS HEAT TREATMENT EFFECTS, SCC VELOCITY IN VARIOUS SOLVENTS AND ELECTROCHEMICAL KINETICS WITH TI - 8-1-1 ALLOY QUARTERLY PROGRESS REPORT, 1 OCT. - 31 DEC. 1966.
Boeing Scientific Research Labs., Seattle, Wash. Solid State Physics Lab.
T. R. Beck. Dec 66, 48p NASA-CR-84653, QPR-2
Contract NAS7-489

Descriptors: *Crack propagation, *Stress corrosion, *Titanium alloy, Alloy, Corrosion, Crack, Electrochemistry, Fracture, Heat, Kinetics, Load, Propagation, Stress, Titanium, Treatment, Velocity.

For abstract, see STAR 05 15.
N67-28006 HC$3.00 MF$0.65

A SURVEY OF SOME METAL OXIDATION PROBLEMS QUARTERLY PROGRESS REPORT NO. 13, 1 JAN. - 31 MAR. 1966.
Brussels Univ. (Belgium).
For primary bibliographic entry see Field 7B.
For abstract, see STAR 05 15.
N67-28214 HC$3.00 MF$0.65

AUSTENITIZATION OF WELMONIX STEEL.
Chantiers de L Atlantique Saint-nazaire (France).
15 Jun 66, 8p EURAEC-1711, EUR-2893
Contract EURATOM-054-61-12-RDF
Its Study No. 1018

Descriptors: *Austenitic steel, *Heat treatment, *Photomicrography, Austenite, Crystal, High temperature, Processing, Structure, Transformation.

For abstract, see STAR 05 15.
N67-28215 HC$3.00 MF$0.65

INVESTIGATING THE POSSIBILITY OF OBTAINING STELLITE POWDER.
Issledovaniye Vozmozhnosti Polucheniya Poroshka Stellita
Holman (John F.) and Co., Inc., Washington, D. C.
G. T. Makshantseva, Z. V. Solovyeva, and V. G. Teplenko. May 67, 6p NASA-TT-F-10946
Contract NASW-1495
Transl. Into English From Sb. Tr. Tsentr. Nauchn.-issled. Chernoi Met. (Moscow), No. 43, 1965 P 115-118

Descriptors: *Chromium alloy, *Cobalt alloy, *Hot pressing, Alloy, Briquette, Carbide, Chloride, Chromium, Cobalt, Composition, Hardness, Hot, Mass, Metal, Oxide, Powder, Pressing, Reduction, Separator, Sintering, Sodium, Stability, Stellite, Thermal.

For abstract, see STAR 05 15.
N67-28227 HC$3.00 MF$0.65

FRACTURE TOUGHNESS OF WIDE 2014- T6 ALUMINUM SHEET AT -320 DEG F.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 20K.
For abstract, see STAR 05 15.
N67-28297 HC$3.00 MF$0.65

UNIAXIAL AND BIAXIAL FRACTURE TOUGHNESS OF EXTRA-LOW-INTERSTITIAL 5 Al-2.5 SN TITANIUM ALLOY SHEET AT 20 DEG K.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 20K.
For abstract, see STAR 05 15.
N67-28299 HC$3.00 MF$0.65

MEASUREMENT OF THE PERMEABILITY OF TUNGSTEN TO NITROGEN FINAL REPORT.
General Electric Co., Cincinnati, Ohio. Nuclear Technology Dept.
P. K. Conn, E. C. Duderstadt, and R. E. Fryxell. Jun 67, 21p NASA-CR-72238, GE-NMP-67-522
Contract NAS3-7967

Descriptors: *Nitrogen, *Permeability, *Tungsten, Activation, Atom, Diffusion, Energy, Membrane, Pressure, Thickness.

For abstract, see STAR 05 15.
N67-28370 HC$3.00 MF$0.65

LOW CYCLE FATIGUE OF NOTCHED SPECIMENS BY CONSIDERATION OF CRACK INITIATION AND PROPAGATION.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 20K.
For abstract, see STAR 05 15.
N67-28371 HC$3.00 MF$0.65

HIGH TEMPERATURE PROTECTIVE COATINGS FOR REFRACTORY METALS PROGRESS REPORT, 21 JAN. - 21 APR. 1967.
Union Carbide Corp., Parma, Ohio. Carbon Products Div.
J. Rexer. 21 Apr 67, 19p NASA-CR-84828, PR-4
Contract NASW-1405

Descriptors: *Diffusion, *Iridium, *Molybdenum alloy, *Protective coating, *Refractory metal, Alloy, Coating, Electroplating, Heat, Hot pressing, Metal, Molybdenum, Protection, Refractory, Treatment.

For abstract, see STAR 05 15.
N67-28788 HC$3.00 MF$0.65

THE DEVELOPMENT OF DISPERSION STRENGTHENED NICKEL-BASE CORROSION RESISTANT ALLOYS.
Melpar, Inc., Falls Church, Va. Materials Lab.
May 67, 16p NASA-CR-54580
Contract NAS3-7271

Descriptors: *Corrosion resistance, *Dispersion hardening, *Nickel alloy, *Vapor deposition, Alloy, Bed, Chromium, Corrosion, Deposition, Dispersion, Fluid, Hardening, Molybdenum, Nickel, Oxide, Plating, Resistance, Vapor.

For abstract, see STAR 05 15.
N67-28796 HC$3.00 MF$0.65

RADIATION METALLURGY SECTION. SOLID STATE DIVISION PROGRESS REPORT FOR PERIOD ENDING JANUARY 1967.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 181.
For abstract, see NSA 21 13.
ORNL-4097 HC$3.00 MF$0.65

11G. MISCELLANEOUS MATERIALS

RESEARCH ON STRIPE DOMAIN STRUCTURES IN FERROMAGNETIC METAL FILMS.
Final rept., 15 Dec 65-15 Dec 66,
Franklin Inst Research Labs Philadelphia Pa
J. D. Blades, and J. B. Drew. 14 Jan 67, 49p Rept no. F-B2462
AFCRL-67-0219
Contract AF 19 (628)-5808

Descriptors: (*Ferromagnetic materials, *Films), (*Ferromagnetism, Anisotropy), Magnetic fields, Stresses, Manufacturing methods, Spin, Torque, Hysteresis.
Identifiers: Magnetic domains.

An experimental and theoretical investigation of ferromagnetic thin films, demonstrating anaomalous stripe domains, has been conducted. The origin of the stripe domains is attributed to the existance of a uniaxial anisotropy perpendicular to the plane of the film which developes from a planar stress system and a vapor beam angle of incidence pile-up structure both relatable to fabrication procedures. The strip domain configuration is a planar 180 degree alternating direction of magnetization pattern with 180 degree Bloch transition walls. It is shown that the existence of a spin-wave type stripe domain system requires (1) a perpendicular anisotropy larger than the planar shape anisotropy or (2) an effective planar demagnetizing field through small sample size in addition to a perpendicular anistropy less than the planar shape anisotropy. (Author)
AD-653 601 HC$3.00 MF$0.65

THE PREPARATION AND STRUCTURE OF ZIRCONIA SPHERES,
Mcmaster Univ Hamilton (Ontario) Dept of Metallurgy and Metallurgical Engineering
A. Madeyski, and W. W. Smeltzer. 9 Feb 67, 11p
AFOSR-67-1358
Grant AF-AFOSR-515-66
Research supported in part by NRC.
Availability: Published in Materials Research Bulletin v2 p427-35 1967.

Descriptors: (*Zirconium oxides, Spheres), (*Refractory materials, Manufacturing methods), Oxides, Theses, Arc melting, Controlled atmospheres, Helium.

A laboratory method is described for preparation of zirconia spheres 50 - 200 microns in diameter and consisting of only a few grains. The essential preparatory step involves spheroidizing in a reducing electric arc with carbon electrodes and a helium atmosphere which results in the formation of non-stoichiometric oxide spheres with improved ductility. Upon cooling, these spheres remain uncracked even though the oxide undergoes a phase transition with a large volume change at relatively low temperatures. The spheres which may exhibit a two-phase structure due to segregation of oxygen saturated metal, are then re-oxidized to fully stoichiometric oxide at temperatures below the transition range. (Author)
AD-653 833 Not available from CFSTI.

MAGNETIC RESONANCE IN HYDROGEN-BONDED FERROELECTRICS.
Nuklearni Institut Jozef Stefan, Ljubljana (Yugoslavia).
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 15.
N67-27873 HC$3.00 MF$0.65

11H. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

HIGH RELIABILITY CONNECTIVE DEVICES.
Final rept., no. 5, 1 Feb 64-31 Jul 66,
Stanford Research Inst Menlo Park Calif
Gunther Steinberg, and Marvin Garrison. Jun 67, 164p
ECOM-03727-F
Contract DA-36-039-AMC-03727 (E)
Continuation of contracts DA-36-039-sc-85275 and DA-36-039-sc-89150, See also AD-482 627.

Descriptors: (*Sliding contacts, Lubrication), (*Lubricants, Films), Electric connectors, Friction, Solids, Organic compounds, Gold, Wear resistance, Metal coatings, Reliability, Surfaces.

The study established that electrical contacts can be successfully lubricated with solid organic compounds. Octadecylamine hydrochloride (ODA.HCl) is capable of providing durable low friction sliding on gold and is regarded as a type of solid organic compound that has inherent lubricity, can be sheared easily, but has the ability to support a load. For good durability, the lubricant must be present in reservoirs in the surface of the contacts. A contact lubricant decreases friction and attendant wear, and maintains the integrity of a protective gold (or other previous metals) platings. Preservation of this plating prevents gross corrosion in sliding contact tracks. Several methods for application of the ODA.HCl to commercial contacts were tested and methods for identifying the presence of the lubricant film were developed. (Author)
AD-653 847 HC$3.00 MF$0.65

LUBRICATION OF BEARING STEELS WITH ELECTROPLATED GOLD UNDER HEAVY LOADS.
Rept. for Jan-Sep 66
Air Force Materials Lab Wright-Patterson AFB Ohio
Riitsu Takagi, and Tung Liu. Mar 67, 23p Rept no. AFML-TR-67-61

Descriptors: (*Steel, Lubrication), (*Gold, *Lubricants), Plating, Sliding contacts, Wear resistance, Friction, Metal films, Electroplating.

The lubricating action of electroplated gold for 52100 steel and 440C stainless steel in sliding motion under a 150-pound load was examined with a modified Alpha Tester (Model LFW-1). The advantage of gold plating was found to be entirely that of wear prevention while the sliding friction coefficient was not altered significantly. The wear lives of thick films were much longer than for thin films. A 20 film had a wear life of 150,000 revolutions. Too thick a film results in fatigue failure at the gold-steel interface. Silver, copper, and two gold alloys were found to be far less effective than pure gold as a lubricant while nickel was not at all effective. The failure of the plated film was usually marked by a rapid increase in wear rate. With thick gold alloy films, wear debris in the form of thin sheets were obtained in addition to the fine particles normally found with metallic films. The appearance of the wear tracks indicated that the gold films underwent considerable plastic deformation. (Author)
AD-653 974 HC$3.00 MF$0.65

BEARING MATERIALS FOR WATER LUBRICATION.
Research and development rept.,
Navy Marine Engineering Lab Annapolis Md
P. Lagally. Mar 67, 34p Rept no. MEL-103/67

Descriptors: (*Lubrication, *Water), (*Bearings, Lubrication), Methanols, Viscosity, Aliphatic compounds, Friction, Alcohols, Ceramic materi-

als, Algae, Tables, Polymers, Marine engineering, Tests.

Isotactic polybutene in contact with a bronze journal was investigated as a bearing material combination for water lubrication. Aliphatic alcohols were used as model substances for protonic lubricants. The fact that even methanol is a better lubricant than water, in spite of its lower viscosity, is attributed to the lower degree of association. 'Stick-slip' motions indicate boundary lubrication of varying degree. Although polybutene compares favorably with many other organic bearing materials, results of this study indicate that wettability with water is a requirement for further improvement. New bearing material designs for water lubrication are proposed. (Author)
AD-654 177 HC$3.00 MF$0.65

11I. PLASTICS

THE WATER ABSORPTION OF AN UNSATURATED POLYESTER RESIN AND GLASS-FIBRE/RESIN COMPOSITES.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
N. C. W. Judd. Feb 67, 20p Rept no. RAE-TR-67042

Descriptors: (*Polyester plastics, Absorption (Physical)), (*Reinforced plastics, Absorption (Physical)), (*Composite materials, Absorption (Physical)), Glass textiles, Diffusion, Fluid flow, Capillary tubes, Temperature, Heat of activation, Great Britain.

Water absorption measurements were made on a cast unsaturated polyester resin and glass-fibre/resin composites at various temperatures. The results were analysed by diffusion and capillary flow equations. Water appeared to enter the resin by a diffusion process. The diffusion coefficients at different temperatures were calculated and an activation energy for the process determined. In glass-fibre composites it appeared that both diffusion and capillary processes were in operation, but that the effect of the diffusion process was reduced by the presence of fibres. (Author)
AD-653 692 HC$3.00 MF$0.65

MILITARY APPLICATIONS OF PLASTICS AND RELATED MATERIALS,
Plastics Technical Evaluation Center Dover N J
Arthur H. Landrock, and Nicholas T. Baldanza.
May 67, 34p Rept no. PLASTEC Note-16

Descriptors: (*Armed forces supplies, Plastics), (*Plastics, State-of-the-art reviews), (*Elastomers, State-of-the-art reviews), (*Plastic coatings, State-of-the-art reviews), Adhesives, Sealing compounds, Reinforced plastics, Vehicles, Structural parts, Aircraft, Weapons, Ammunition, Optical materials, Armor, Structures, Packaging, Expanded plastics, Bibliographies.

Plastics, elastomers, polymeric coating materials, adhesives and sealants are rapidly increasing in importance for use in military applications. The report gives a to-date review of these uses. Included in the discussion are plastics applications in such end items as vehicles, weapons and missiles, armor and ammunition, shelters and buildings, packs and containers, and medical-surgical devices. The bibliography consists of 59 items. (Author)
AD-653 837 HC$3.00 MF$0.65

SYNTHESIS OF POLYMERS CONTAINING FERROCENENITROGEN WITH A SYSTEM OF CONJUGATED BONDS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7C.
AD-653 957 HC$3.00 MF$0.65

STRESSES FROM STRAINS ON WOVEN-ROVING, FIBER-GLASS-REINFORCED PLASTIC.
Naval Ship Research and Development Center Annapolis Md Annapolis Div
For primary bibliographic entry see Field 11D.
AD-654 164 HC$3.00 MF$0.65

COMPATIBILITY OF POLYMERIC FILMS WITH LIQUID OXYGEN.
Boeing Co., Seattle, Wash. Aerospace Group.
J. T. Hoggatt. Jan 67, 30p NASA-CR-72134
Contract NAS3-7952

Descriptors: *Impact sensitivity, *Liquid oxygen (lox), *Material testing, *Polymer, *Thin film, Bladder, Compatibility, Expulsion, Film, Fluorocarbon, Impact, Liquid, Material, Mylar, Oxygen, Polyester, Polyimide, Sensitivity, Teflon, Test, Testing, Thin.

For abstract, see STAR 05 15.
N67-28755 HC$3.00 MF$0.65

AN INVESTIGATION OF THE MECHANISM OF ADHESION TO TEETH.
Harris Research Labs., Inc., Washington, D. C.
For primary bibliographic entry see Field 6E.
PB-174 848 HC$3.00 MF$0.65

11J. RUBBERS

FLUOROCARBON NITRIDE ELASTOMERS.
Final rept., 8 Mar 66-8 Mar 67,
Thiokol Chemical Corp Denville N J Reaction Motors Div
Robert A. Falk. 8 Mar 67, 70p Rept no. RMD-5086-F
Contract NOw-66-0289

Descriptors: (*Heat-resistant plastics, Preparation), (*Halocarbon plastics, *Elastomers), (*Halogenated hydrocarbons, Synthesis (Chemistry)), (*Organic nitrogen compounds, Synthesis (Chemistry)), Fluorine compounds, Imines, Azines, Butadienes, Ethylenes, Copolymerization, Photolysis, Thermal stability, N-heterocyclic compounds, Spectra (Infrared), Nuclear magnetic resonance, Mass spectrum.
Identifiers: Perfluoro aziridines, Perfluoro diazabutadienes, Perfluoro isopropylidenimines, Perfluoropropyl fluorodiazine oxides.

The search for an improved heterofluorocarbon elastomer is described. The synthesis of a number of new fluorimine monomers led to the useful monomer - perfluoroisopropylidenimine, (CF3)2C=NF. It was successfully copolymerized with tetrafluoroethylene by gamma-irradiation to yield a copolymer which melts to a free-flowing liquid at 270-280C. Preliminary characterization of this copolymer is described. The new compounds, perfluoro-1,4diazabutadiene-1,3, 3, perfluoro-1, 4-diazabutene-1, and N-fluoro-N'-sec-perfluoropropyldiazine-N'-oxide, are reported. The diene shows no useful monomer reactivity. Attempts to prepare N-fluoro and N-trifluoromethyl perfluoroaziridine monomers are reported. (Author)
AD-653 432 HC$3.00 MF$0.65

IMPROVEMENT OF TEAR RESISTANCE OF COATED FABRICS.
Melpar Inc Falls Church Va
For primary bibliographic entry see Field 11E.
AD-653 792 HC$3.00 MF$0.65

MILITARY APPLICATIONS OF PLASTICS AND RELATED MATERIALS,
Plastics Technical Evaluation Center Dover N J
For primary bibliographic entry see Field 11I.
AD-653 837 HC$3.00 MF$0.65

THE CHARACTERISATION OF ETHYLENE-PROPYLENE VULCANISATES.
Royal Aircraft Establishment, Farnborough (England).
B. B. Mooore, and D. K. Thomas. Dec 66, 22p
RAE-TR-66388

Descriptors: *Ethylene, *Propylene, *Vulcanizate, Axial, Characterization, Compression, Copolymer, Cross, Density, Elasticity, Heptane, Linking, Measurement, Reaction, Rubber, Strain, Stress, Swelling, Synthetic, Tension.

For abstract, see STAR 05 15.
N67-27938 HC$3.00 MF$0.65

11K. SOLVENTS, CLEANERS, AND ABRASIVES

THE INFLUENCE OF SURFACE-ACTIVE MATERIAL ON THE PROPERTIES OF AIR BUBBLES AT THE AIR/SEA INTERFACE,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 8J.
AD-653 458 HC$3.00 MF$0.65

DIMENSIONAL ANALYSIS OF THE DETERGENCY PROCESS FOR SYSTEMS CONTAINING MULTI-COMPONENT SOILS.
Progress rept.,
Army Coating and Chemical Lab Aberdeen Proving Ground Md
A. N. Mankowich. May 67, 38p Rept no. CCL-229

Descriptors: (*Surface-active substances, Analysis), Impurities, Removal, Cleaning compounds, Alcohols, Fatty acid esters, Amines, Fatty acids, Polarization, Dipole moments, Molecular association.

Dimensional analysis of the detergency process has been extended from soil-surfactant systems containing a single polar soil to those with binary and ternary component soils containing a nonpolar ingredient. This was made possible by (1) replacement of the soil dipole moment variable by the proportional square root of orientation polarization (Po), and (2) establishment of the validity of the empirical volume fraction additivity of the ingredient Po values of binary polar - polar mixtures using the classical dilute solution - solute (P2) extrapolation procedure with a chemical oscillometer. (Author)
AD-653 571 HC$3.00 MF$0.65

11L. WOOD AND PAPER PRODUCTS

NATURAL RESISTANCE OF WOODS TO BIOLOGICAL DETERIORATION IN TROPICAL ENVIRONMENTS. PART I. SCREENING TESTS OF A LARGE NUMBER OF WOOD SPECIES.
Interim rept.,
Naval Research Lab Washington D C
C. R. Southwell, C. W. Hummer, Jr., B. W. Forgeson, T. R. Price, and T. R. Sweeney. 7 Feb 62, 49p Rept no. NRL-5673-Pt-1

Descriptors: (*Wood, Biological contamination), (*Tropical deterioration, Wood), Identification, Sampling, Exposure, Test methods, Marine borers, Resistance (Biological), Isoptera, Degradation, Tropical tests, Sea water, Soils, Fungus deterioration.

In four different tropical environments, heavily infested with wood-destroying organisms, 114 species of scientifically identified woods have been undergoing a screening test for periods up to an 18-month exposure. Many of the woods were selected because of their reputed resistance to biological attack. Results of marine borer resistance studies have revealed 21 woods to be highly resistant to borers in Pacific Ocean water for the first 14 months of exposure. In tropical brackish water only 3 woods studied were highly resistant and very heavy damage was observed on 69 during the 14-month period. Stake tests in tropical jungle soil on both the Atlantic and Pacific Coasts of Panama showed 26 woods to be very durable to both subterranean termites and fungal decay for the first 18 months of exposure. A number of these resistant woods had not been studied previously. From the results of these studies, each wood included has been assigned resistance ratings of high, moderate, or low in respect to marine borer attack in sea water, teredo attack in brackish water, subterranean termites in tropical soil, and fungal decay in contact with jungle soil. Detailed descriptions of wood species which are considered to be of special interest are included. (Author)
AD-653 856 HC$3.00 MF$0.65

LIST OF PUBLICATIONS ON FIRE PERFORMANCE.
Forest Products Labs., Madison, Wis.
May 67, 5p FPL-67-005

Descriptors: (*Flammability, *Wood), Bibliographies, Pyrolysis, Fire resistant materials, Plywood, Protective treatments, Fire safety.

The list includes publications that give general information and the results of research by the Forest Products Laboratory on fire test methods, fire-retarding chemicals and treatments, and fire behavior of treated and untreated wood, wood products, and wood structures. (Author)
PB-174 845 HC$3.00 MF$0.65

FEASIBILITY FOR THE ESTABLISHMENT OF A CONTROLLED WOOD SHAVINGS PLANT IN NORTHEAST MINNESOTA.
Saunders (W. B.) and Co., Washington, D. C.
For primary bibliographic entry see Field 5C.
PB-174 918 HC$3.00 MF$0.65

12. MATHEMATICAL SCIENCES

12A. MATHEMATICS AND STATISTICS

KINETIC METHODS AND THE FREE EXPANSION PROBLEM,
Geophysics Corp. of America, Bedford, Mass.
For primary bibliographic entry see Field 20D.
AD-291 772 HC$3.00

NEARLY-FREE MOLECULAR FLOW: A COMPARISON OF THEORY AND EXPERIMENT,
California Univ., Berkeley. Inst. of Engineering Research.
For primary bibliographic entry see Field 20D.
AD-456 356 HC$3.00

CONCENTRATED FORCE IN EIGHTH-SPACE WITH MIXED BOUNDARY CONDITIONS,
American Univ Beirut (Lebanon)
For primary bibliographic entry see Field 20K.
AD-653 439 Not available from CFSTI.

ON WEIGHTS OF CONSTANT-SUM MAJORITY GAMES.
Research memo.,
Hebrew Univ Jerusalem (Israel) Dept of Mathematics
Bezalel Peleg. May 67, 12p Rept no. RM-27
Contract N62558-4355
Rept. on Research Program in Game Theory and Mathematical Economics.

Descriptors: (*Game theory, Integral equations), Real numbers, Set theory, Theorems, Integrals, Operations research.

It is shown that the nucleolus of a constant-sum weighted majority game G is a system of weights for G; moreover, if G is homogeneous then the nucleolus of G supplies homogeneous weights. Minimum and minimal integer weights are discussed with respect to their relations to the kernel and the nucleolus.
AD-653 456 HC$3.00 MF$0.65

GEOGRAPHY AND THE PROPERTIES OF SURFACES. CONCEPTS AND APPLICATIONS-SPATIAL ORDER.
Harvard Univ Cambridge Mass Lab for Computer Graphics
For primary bibliographic entry see Field 8F.
AD-653 464 HC$3.00 MF$0.65

THE LAW OF THE ITERATED LOGARITHM FOR CONTINUED FRACTIONS,
Duke Univ Durham N C
Olaf P. Stackelberg. 6 Nov 64, 21p
AFOSR-67-1322
Grant AF-AFOSR-435-63
Prepared in cooperation with Technische Hochschule. Stuttgart (West Germany).
Availability: Published in Duke Mathematical Journal v33 n4 p801-20 Dec 1966.

Descriptors: (*Continued fractions, Theorems), Functions, Iterations, Random variables, Mathematics, Integral equations, Measure theory.

The purpose of this paper is to prove that lim sup as N approaches infinity, of the absolute value (sigma log a sub i/K sub i, i = 1 to i = N), divided by the square root of (2K sub 2 N log log N), the whole quotient = 1 a e. on (0,1), where K sub one is KHINTCHINE'S constant and K2 = lim as N approaches infinity, of 1/N times the integral taken between the limits 0 and 1, of (sigma from i = 1 to i = N, log (a sub one (x)/K sub one)) quantity squared, dx/ (1 + x) log 2, the whole thing >0.
AD-653 494 Not available from CFSTI.

ON THE POINT SPECTRUM OF A TOEPLITZ OPERATOR,
Johns Hopkins Univ Baltimore Md
Douglas N. Clark. 30 Mar 66, 19p
AFOSR-67-1289
Contract AF 49 (638)-1382
Availability: Published in Transactions of the American Mathematical Society v126 n2 p251-66 Feb 1967.

Descriptors: (*Operators (Mathematics), Theory), Theorems, Functions, Periodic variations, Exponential functions.
Identifiers: Toeplitz operators.

On the space H superscript P, 1 < p = or < 2, we consider the Toeplitz operator T (f), associated with f (phi) epsilon L superscript q, 1/p + 1/q = 1. An idea of Hartman and Wintner is applied to obtain necessary and sufficient conditions that 0 (and hence any complex lambda) belong to the point spectrum of T (f), under the assumption that f (phi) is continuous except at finitely many points of (0,2 phi). The results generalize those of Widom (111.Jour.Math. 4 (1960)88-99) and Hartman (Amer.Jour.Math. 85 (1963),59-78). (Author)
AD-653 501 Not available from CFSTI.

A PROCEDURE FOR RANKING DIAGNOSTIC TEST INPUTS,
Illinois Univ Urbana Coordinated Science Lab
For primary bibliographic entry see Field 9B.
AD-653 523 HC$3.00 MF$0.65

SOME GENERALIZATIONS IN SYSTEM THEORY AND THEIR APPLICATIONS TO CONTROL SYSTEMS,
Illinois Univ Urbana Coordinated Science Lab
Sadanand D. Agashe. May 67, 135p Rept no. R-356
Contract DA-28-043-AMC-00073 (E)

Descriptors: (*Control systems, *Mathematical analysis), (*Linear systems, Theory), Perturbation theory, Feedback, Stochastic processes, Response, Vector analysis, Equations, Theorems, Matrix algebra, Functions, Numerical analysis.

Some definitions of the concepts 'state' and 'state-deterministic system' have been given by L. A Zadeh and C. A. Desoer in their book 'Linear System Theory: The State Space Approach'. In this thesis, using some of their ideas such as physical systems and their measurable attributes, a more fundamental definition of a 'system' is given. Two new concepts, namely, 'functional dependence' and 'quasi-functional dependence' between attribute sets, are introduced, by means of which the concepts of output, input, and state, attribute sets are defined. Comparison of systems in two ways, in terms of their 'index sets' and in terms of their 'attributes sets,' is used to clarify the concepts of 'extensionally-state-determined' and 'extensionally-state-stochastic' systems. The concept of 'versatility of a system' is next introduced to provide a third way of comparing two systems. It is shown that if a linear control system is less versatile than another, it is as versatile as the latter system provided with a suitable linear feedback and with the system matrix same as that of the first. Two theorems are proved regarding the versatility of linear free systems. A new perturbation process, called 'brief perturbation process' here, which can be applied to control systems, is described in detail. Next, an interesting connection between uncontrollability and optimality is pointed out and the well-known sufficient conditions for controllability of a linear time-invariant control system are derived. Finally, a new definition of impulse response for linear as well as nonlinear control systems, using the concept of a brief perturbation process, is given. (Author)
AD-653 524 HC$3.00 MF$0.65

CONCERNING CERTAIN PROPERTIES AND THE LIMIT THEOREM OF A SIMPLE FUNCTION OF THE ITO RANDOM INTEGRAL,
Foreign Technology Div Wright-Patterson AFB Ohio
Chia-kang Waung. 25 Jan 67, 26p Rept no. FTD-HT-66-607
TT-67-62118
Edited trans. of Shu Hsueh Hsueh Pao (Chinese People's Republic) v14 n4 p517-31 1964.

Descriptors: (*Stochastic processes, *Random variables), Probability, Theorems, Integral equations, Mathematics.

This paper discusses the properties and limit theorems of a sample function of the Ito stochastic integral. Most of the results in this paper can be regarded as a generalization of Cogburn and Tucker's limit theorem for a function of increments of a decomposable process. The paper begins with a derivation of certain properties of the sample function of the stochastic process defined by an Ito stochastic integral. Then the author uses the derived result in an investigation of analogous limit theorems. Five theorems are stated and proved in the paper. The first three theorems show that: (1) the sample function y (t) with a staircase has probability 1; (2) the sample function y (t) with

a pure step function has a finite discontinuity in finite times; (3) the sample function y (t) has a bounded magnitude. The last two theorems only indicate the probability limits of the function of the increments of x (t).
AD-653 550 HC$3.00 MF$0.65

APPLICATION OF ORTHOGONAL FILTERS FOR OPTIMIZATION AND INVESTIGATION OF STATISTICAL PROPERTIES OF ERRORS OF SELF-ADJUSTING SYSTEMS,
Foreign Technology Div Wright-Patterson AFB Ohio
G. A. Sergeev, and A. F. Romanenko. 28 Mar 67, 23p Rept no. FTD-MT-66-67
TT-67-62130
Primenenie Ortogonalnykh Filtrov dlya Optimizatsii i Issledovaniya Statisticheskikh Svoistv Oshibok Samonastraivayushchikhsya Sistem, edited machine trans. of mono. Analiticheskie Samonastraivaiushchiesya Sistemy Avtomaticheskogo Upravlenia, Moscow, 1965 p221-32.

Descriptors: (*Adaptive systems, Mathematical analysis), Correlation techniques, Operators (Mathematics), Random variables, Automation, Errors, Statistical analysis, Digital computers, Data processing systems.

The authors present an equation that can be used for the definition of a simple and comparatively efficient smoothing out operator S sub T, convenient for the processing of nonstationary processes.
AD-653 560 HC$3.00 MF$0.65

RESULTS ON LOCATION AND SCALE PARAMETER ESTIMATION WITH APPLICATION TO THE EXTREME-VALUE DISTRIBUTION,
Rocketdyne Canoga Park Calif
Nancy R. Mann. Feb 67, 187p
ARL-67-0023
Contract AF 33 (615)-2818

Descriptors: (*Distribution functions, Statistical functions), Reliability, Sampling, Mathematics, Probability, Life expectancy, Least squares method.
Identifiers: Extreme-value problem, Weibull distribution.

The report gives results concerning estimation of location and scale parameters. Most of the work pertains to the first extreme-value distribution of smallest values, the distribution of the natural logarithms of failure times having the two-parameter Weibull distribution. Experimental designs are derived, under the assumption that log failure times are polynomial functions of the reciprocal of stress level and have the extreme-value distribution, for over-stress life tests. These designs yield least-squares curves with minimum variance at a specified (nominal) stress level below the levels at which the life test is conducted. An estimate of the extreme-value location parameter u associated with the nominal stress level and the relationship between u and stress level can be obtained from the least squares curve. Other extreme-value results apply to a life test conducted at a single fixed stress level. (Author)
AD-653 575 HC$3.00 MF$0.65

RESEARCH ON SOLUTIONS OF THE GRAVITATIONAL FIELD EQUATIONS.
Pittsburgh Univ Pa
For primary bibliographic entry see Field 20J.
AD-653 581 HC$3.00 MF$0.65

SEISMIC DIFFRACTION BY CRUSTAL DISCONTINUITIES.
Rhode Island Univ Kingston Dept of Electrical Engineering
For primary bibliographic entry see Field 8K.
AD-653 582 HC$3.00 MF$0.65

RESULTS ON NON-ORTHOGONAL INCOMPLETE FACTORIAL DESIGNS,
Rocketdyne Canoga Park Calif
Steve R. Webb. Feb 67, 65p
ARL-67-0021
Contract AF 33 (615)-2818

Descriptors: (*Combinatorial analysis, *Design), (*Resolution, Design), Statistical tests, Polynomials, Sequential analysis, Analysis of variance, Theory, Statistical analysis.

The report consists of three distinct but related papers. The first is concerned with methods for constructing designs to meet realistic requirements on the number of runs and with criteria for selecting a design from a number of alternatives. Examples of various construction techniques are illustrated and designs are given which were constructed for actual experiments. Two specific numerical criteria are developed, and a convenient computer routine for evaluating them is described. The second paper discusses designs of even resolution. It is shown that the smallest resolution 4 designs for n factors at two levels must contain at least 2n runs, and that 'foldover' designs are available with 2n runs. It is conjectured that the only minimal resolution 4 designs are foldover designs. The case of resolution 6 designs is also discussed. The third paper gives the variance bounds for estimates of main effects using one-at-a-time designs, and characterizes those designs which achieve the lower bounds. Situations in which runs are conducted a block at a time (rather than singly) are treated and it is shown that inclusion of interaction terms in the model improves the main-effect estimates of factors involved in the interactions. (Author)
AD-653 592 HC$3.00 MF$0.65

THEORY AND TABLES FOR TESTS OF HYPOTHESES CONCERNING THE MEAN AND THE VARIANCE OF A WEIBULL POPULATION.
Final rept.,
Aerospace Research Labs Wright-Patterson AFB Ohio
H. Leon Harter, and Satya D. Dubey. Mar 67, 401p Rept no. ARL-67-0059

Descriptors: (*Statistical distributions, Tables), Monte Carlo method, Simulation, Probability density functions, Statistical tests, Sampling, Statistical functions.
Identifiers: Weibull distribution.

A summary is given of the current state of knowledge concerning the analysis of data arising from Weibull populations. Five different parameterizations which have been used by various authors are given, and the relation of the various sets of parameters to each other and to the mean and the variance is explored. It is shown that the standardized cumulants are functions only of the shape parameter. An auxiliary table is given of the mean and the variance of a Weibull population with location parameter 0 and scale parameter 1 and of the standardized cumulants gamma sub k (k = 3,4,...,8), all for shape parameter m = 1.1 (0.1)10.0. The theory is developed for tests of hypotheses concerning the mean and the variance of a Weibull population, based on the Weibull-Z, Weibull-T, and Weibull-V statistics, which are analogues of the normal-z, Student-t, and (chi square)/ (degrees of freedom) statistics, respectively, the difference being that the underlying distribution is Weibull rather than normal. Percentage points of the Weibull-Z statistic are worked out by use of the Cornish-Fisher expansion technique and similar results for the Weibull-V and Weibull-T statistics are obtained by means of a Monte Carlo simulation. The percentage points are tabulated for all combinations of the above values of m; sample sizes n = 2 (1)40, 48, 60, 80, 120, 240, infinity; and cumulative probabilities P = 0.005, 0.01, 0.025, 0.05, 0.1, 0.25, 0.75, 0.9, 0.95, 0.975, 0.99, 0.995. Examples illustrating the use of the tables are given. (Author)
AD-653 593 HC$3.00 MF$0.65

CONSTRUCTION OF STEADY-STATE HYDROMAGNETIC DYNAMOS. II. THE SPHERICAL CONDUCTOR,
New York Univ N Y Magneto-Fluid Dynamics Div
For primary bibliographic entry see Field 20I.
AD-653 603 HC$3.00 MF$0.65

ANALYSIS OF AN APERTURE ANTENNA SYSTEM LOADED WITH AN INHOMOGENEOUS DIELECTRIC.
Michigan Univ Ann Arbor Cooley Electronics Lab
For primary bibliographic entry see Field 9A.
AD-653 642 HC$3.00 MF$0.65

SOME PROCEDURES FOR SELECTION OF MULTIVARIATE NORMAL POPULATIONS BETTER THAN A CONTROL,
Aerospace Research Labs Wright-Patterson AFB Ohio
P. R. Krishnaiah, and M. Haseeb Rizvi. Apr 67, 18p Rept no. ARL-67-0080
Prepared in cooperation with Ohio State Univ., Columbus. Dept. of Mathematics.
Availability: Published in Multivariate Analysis p477-90 1966.

Descriptors: (*Multivariate analysis, Mathematics), Population (Mathematics), Equations, Theorems, Mathematical prediction.

In many practical situations one is interested in selecting populations better than a control population. Paulson, Dunnett, and Gupta and Sobel have treated the problem for various specific univariate populations. They require the procedures to satisfy different types of specifications. Lethmann defines a number of optimum properties of selection procedures, and for some of these characterizes the optimal procedure in the univariate case. He also treats the applications to distributions with monotone likelihood ratio when the parameter of the standard population is known. Recently Krishnaiah has considered the problem of selecting multivariate normal populations better than a control on the basis of the linear combinations of the elements of covariance matrices. In the present paper, selection procedures are proposed when comparisons are made on the basis of the linear combinations of the elements of the mean vectors of multivariate normal populations. (Author)
AD-653 660 Not available from CFSTI.

MAXIMUM-LIKELIHOOD ESTIMATION OF THE PARAMETERS OF A FOUR-PARAMETER GENERALIZED GAMMA POPULATION FROM COMPLETE AND CENSORED SAMPLES.
Revised ed.,
Aerospace Research Labs Wright-Patterson AFB Ohio
H. Leon Harter. Jul 66, 11p Rept no. ARL-67-0089
Revision of manuscript received Sep 65.
Availability: Published in Technometrics v9 n1 p159-65 Feb 1967.

Descriptors: (*Mathematical prediction, Special functions (Mathematical)), Iterations, Sampling, Probability density functions, Tables, Mathematics.
Identifiers: Maximum likelihood.

Consider the four-parameter generalized Gamma population with location parameter c, scale parameter a, shape/power parameter b, and power parameter p (shape parameter d = bp) and probability density function f (x; c, a, b, p) = p (x - c) raised to the power (bp-1), exp (- ((x - c)/a) raised to the power p)/a raised to the power bp, Gamma (b), where a, b, p > 0 and x = or > c = or > 0. The likelihood equations for parameter estimation are

obtained by equating to zero the first partial derivatives, with respect to each of the four parameters, of the natural logarithm of the likelihood function for a complete or censored sample. The asymptotic variances and covariances of the maximum-likelihood estimators are found by inverting the information matrix, whose components are the limits, as the sample size n approaches infinity, of the negatives of the expected values of the second partial derivatives of the likelihood function with respect to the parameters. The likelihood equations cannot be solved explicitly, but an iterative procedure for solving them on an electronic computer is described. The results of applying this procedure to samples from Gamma, Weibull, and half-normal populations are tabulated, as are the asymptotic variances and covariances of the maximum-likelihood estimators. (Author)
AD-653 663 Not available from CFSTI.

SECOND-ORDER STATISTICS OF ALTERNATED STEPWISE PROCESSES.
Revised ed.,
Massachusetts Inst of Tech Lexington Lincoln Lab
Oscar A. Z. Leneman. 14 Mar 66, 12p Rept no. JA-2645
ESD-TR-67-249
Contract AF 19 (628)-5167, Grant NsG-259
Revision of manuscript submitted 14 Sep 65.
Availability: Published in SIAM J. Appl. Math., v15 n1 p88-97 Jan 1967.

Descriptors: (*Statistical analysis, Sampling), Random variables, Correlation techniques, Probability, Probability density functions, Mathematics.
Identifiers: Stationary point processes.

The concept of binary processes is generalized by discussing the class of alternated stepwise processes in which the jump points constitute a stationary point process. With some heuristics, their second-order statistical properties are evaluated and various illustrations are provided. (Author)
AD-653 670 Not available from CFSTI.

POINT INTERVAL ESTIMATION, FROM ONE-ORDER STATISTIC, OF THE LOCATION PARAMETER OF AN EXTREME-VALUE DISTRIBUTION WITH KNOWN SCALE PARAMETER AND OF THE SCALE PARAMETER OF A WEIBULL DISTRIBUTION WITH KNOWN SHAPE PARAMETER,
Aerospace Research Labs Wright-Patterson AFB Ohio
Albert H. Moore. Feb 67, 12p Rept no. ARL-67-0027
Availability: Published in IEEE Transactions on Reliability vR-15 n3 p120-7 Dec 1966.

Descriptors: (*Statistical distributions, Reliability), Sampling, Life expectancy, Monte Carlo method, Random variables, Mathematics.
Identifiers: Weibull distribution, Extreme-value problem.

This paper derives a one-order statistic estimator Umnb for the location parameter of the (first) extreme-value distribution of smallest values with cumulative distribution function F (x;u,b) = 1 exp (-exp ((x-u)/b)) using the minimum-variance unbiased one-order statistic estimator for the scale parameter of an exponential distribution. It is shown that exact confidence bounds, based on one-order statistic, can be easily derived for the location parameter of the extreme-value distribution and for the scale parameter of the Weibull distribution, using exact confidence bounds for the scale parameter of the exponential distribution. The estimator for u is shown to be b ln cmn + xmn where xmn is the mth order statistic from an ordered sample of size n from the extreme-value distribution with scale parameter b and cmn is the coefficient for a one-order statistic estimator of the scale parameter of an exponential distribution. Values of the factor cmn, which have previously been tabulated for n = 1 (1)20, are given for n = 21 (1)40. The ratios of the mean-square-errors of the maximum-likelihood estimators based on m order statistics to those of the one-order statistic estimators for the location parameter of the extreme-value distribution and the scale parameter of the Weibull distribution are investigated by Monte Carlo methods. The use of the table and related tables is discussed and illustrated by numerical examples.
AD-653 701 Not available from CFSTI.

OPTIMAL QUADRATURES IN L2 (Ep), II,
Brown Univ Providence R I Div of Applied Mathematics
Robert E. Barnhill. Mar 67, 18p
Contract Nonr-562 (36)
Prepared in cooperation with Utah Univ., Salt Lake City, Dept. of Mathematics, Grant NSF-GP-5900.

Descriptors: (*Numerical analysis, Numerical methods and procedures), Analytic functions, Hilbert space, Inequalities, Tables, Approximation (Mathematics), Mathematics.
Identifiers: Quadrature formulae.

This paper is an extension of an earlier paper in which the hypercircle inequality was applied to quadratures of a certain class of analytic functions. In this paper the quadrature's nodes are allowed to be variable and the bound obtained from the hypercircle inequality is minimized with respect to the nodes. Computed tables and examples are also given. (Author)
AD-653 713 HC$3.00 MF$0.65

A PATH INDEPENDENT INTEGRAL AND THE APPROXIMATE ANALYSIS OF STRAIN CONCENTRATION BY NOTCHES AND CRACKS,
Brown Univ Providence R I Div of Engineering
J. R. Rice. May 67, 49p Rept no. E39
Contract SD-86

Descriptors: (*Integrals, *Cracks), Strain (Mechanics), Numerical analysis, Deformation, Plasticity, Strain hardening, Intensity, Stresses, Plastics, Elasticity, Fracture (Mechanics).

An integral is exhibited which has the same value for all paths surrounding a class of notches in two-dimensional deformation fields of linear or non-linear elastic materials. The integral may be evaluated almost by inspection for a few notch configurations. Also, for materials of the elastic-plastic type (treated through a deformation rather than incremental formulation), with a linear response to small stresses followed by non-linear yielding, the integral may be evaluated in terms of Irwin's stress intensity factor when yielding occurs on a scale small in comparison to notch size. On the other hand, the integral may be expressed in terms of the concentrated deformation field in the vicinity of the notch tip. This implies that some information on strain concentrations is obtainable without recourse to detailed non-linear analyses. Such an approach is exploited here. Applications are made to: Approximate estimates of strain concentrations at smooth ended notch tips in elastic and elastic-plastic materials, A general solution for crack tip separation in the Barenblatt-Dugdale crack model, leading to a proof of the identity of the Griffith theory and Barenblatt cohesive theory for elastic brittle fracture and to the inclusion of strain hardening behavior in the Dugdale model for plane stress yielding, and An approximate perfectly plastic plane strain analysis, based on the slip line theory, of contained plastic deformation at a crack tip and of crack blunting. (Author)
AD-653 716 HC$3.00 MF$0.65

CONFERENCE ON CLUSTER ANALYSIS OF MULTIVARIATE DATA, NEW ORLEANS, LA., DECEMBER 9, 10 AND 11.
Catholic Univ of America Washington D C
For primary bibliographic entry see Field 5J.
AD-653 722 HC$3.00 MF$0.65

BOUNDS ON THE EFFICIENCY OF A CLASSIFICATION PROCEDURE.
Technical rept.,
Stanford Univ Calif Dept of Statistics
Herman Chernoff. 16 Jun 67, 23p Rept no. TR-56
Contract Nonr-225 (72)

Descriptors: (*Functional analysis, Statistical analysis), Random variables, Classification, Tables, Mathematical analysis, Mathematics.
Identifiers: Discriminant functions.

In a study of character recognition Dolby found it convenient to replace linear discriminant functions by simpler functions consisting of sums of some of the observations. In the cases studied the efficiency of these more convenient sums were remarkably high. This paper discusses circumstances where bounds may be derived on the efficiency of the use of sums.
AD-653 724 HC$3.00 MF$0.65

SOME NEW APPROACHES TO RISK.
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
For primary bibliographic entry see Field 12B.
AD-653 727 HC$3.00 MF$0.65

THE STRUCTURE OF ECONOMIC MODELS,
George Washington Univ Washington D C Logistics Research Project
For primary bibliographic entry see Field 12B.
AD-653 728 HC$3.00 MF$0.65

ON SUBHARMONICITY OF DOUBLY SUBHARMONIC FUNCTIONS.
Revised ed.,
Washington Univ Seattle
Maynard G. Arsove. 1 Dec 65, 9p
AFOSR-67-1335
Grant AF-AFOSR-936-65
Prepared in cooperation with Eidgenoessische Technische Hochschule, Zurich (Switzerland).
Revision of manuscript submitted 11 Aug 65.
Availability: Published in Proceedings of the American Mathematical Society v17 n3 p622-6 Jun 1966.

Descriptors: (*Potential theory, Mathematics), Theorems, Measure theory, Operators (Mathematics).
Identifiers: Harmonic functions, Euclidean space.

We propose to generalize Avanissian's theorem, i.e., if u is doubly subharmonic and locally bounded above, then u must be subharmonic, by replacing the local majorizing constant by a summable function. Our main results are: (1) If u is a doubly subharmonic function on a region in the space of two complex variables on a region admitting a locally summable majorant, then u is subharmonic on that region omega (2). Let u be a doubly subharmonic function on a region omega such that u (Z, xi) is harmonic in Z for each xi. If u admits a locally summable minorant, then u is subharmonic on a region omega (3). If u is a doubly harmonic function on a region omega admitting a locally summable majorant, then u is harmonic on a region. (Author)
AD-653 735 Not available from CFSTI.

COMPARISON THEOREMS FOR ELLIPTIC EQUATIONS ON UNBOUNDED DOMAINS,
British Columbia Univ Vancouver
Charles A. Swanson. 13 Jul 66, 12p
AFOSR-67-1315
Grant AF-AFOSR-379-66
Availability: Published in Transactions of the Am-

erican Mathematical Society v126 n2 p278-85 Feb 1967.

Descriptors: (*Partial differential equations, Mathematics), Theorems, Operators (Mathematics), Matrix algebra, Inequalities.
Identifiers: Euclidean space.

Comparison theorems of Sturm's type are obtained for a pair of linear elliptic partial differential equations L sub k (u) = 0, k = 1,2, on unbounded domains R in n-dimensional Euclidean space. If there exists a nontrivial solution of L sub 1 (u) = 0 which vanishes on the boundary of R and satisfies a suitable smallness condition at infinity, sufficient conditions are derived which ensure that very solution of L sub 2 (v) = 0 vanishes at some point in R included in the boundary of R. The theorems obtained are extensions of those obtained by the author for bounded domains. The main result is new even in the one-dimensional self-adjoint case, and constitutes an extension of Leighton's theorem.
AD-653 743 Not available from CFSTI.

ON STABILITY FOR DIFFERENCE SCHEMES: A SHARP FORM OF GARDING'S INEQUALITY,
New York Univ N Y Courant Inst of Mathematical Sciences
P. D. Lax, and L. Nirenberg. May 66, 21p
NYO-1480-76
Contract AT (30-1)-1480, Grant AF-AFOSR-684-64
Availability: Published in Communications on Pure and Applied Mathematics v14 n4 p473-92 Nov 1966.

Descriptors: (*Inequalities, Operators (Mathematics)), Special functions (Mathematical), Matrix algebra, Theorems, Mathematics, Stability.

In this paper inequalities are derived for difference and pseudo-differential operators; we show that if the symbol of such an operator satisfies a certain inequality, then the operator itself satisfies an analogous inequality, modulo a lower order error term. This pattern of inference is typical of many results concerning these operators. In Section 1 we show how the inequality for difference operators can be employed to derive two new stability criteria for difference schemes used in solving numerically the initial value problem for hyperbolic equations. The main inequality for difference operators -- Theorem 1.1, proved in Section 2 -- is an analogue for difference schemes of a sharp form of Garding's inequality for differential operators. In Section 3 we prove the sharp inequality for vector functions.
AD-653 753 Not available from CFSTI.

SOLUTION OF THE TWO-SIDED CAUCHY PROBLEM FOR AN m-DIMENSIONAL GENERALIZED ACOUSTIC SYSTEM,
Ballistic Research Labs Aberdeen Proving Ground Md
For primary bibliographic entry see Field 20D.
AD-653 789 HC$3.00 MF$0.65

MAXIMAL IDEALS IN THE ALGEBRA OF BOUNDED HOLOMORPHIC FUNCTIONS.
Doctoral thesis,
Massachusetts Inst of Tech Cambridge
Irwin Kra. 21 May 66, 9p
AFOSR-67-1362
Grant AF-AFOSR-335-63
Availability: Published in Michigan Mathematical Journal v14 p83-8 1967.

Descriptors: (*Functions, *Algebras), Complex variables, Mathematics, Topology, Theorems, Mapping (Transformations), Theses.

Let B (X) be the ring of bounded holomorphic functions on an open Riemann surface X, and assume that B (X) is a proper extension of the complex numbers. With respect to the supremum norm, B (X) is a Banach algebra. (Because B (X) is semisimple, this is the only norm, up to equivalence.) Let M (X) be the maximal ideal space of B (X), endowed, as usual, with the weak-star topology. For x a member of X, define M (x) = (f a member of B (X) such that f (x) = 0). M (x) is a maximal ideal of B (X). We call such maximal ideals of type I; all others are called of type II. In this paper, we obtain several characterizations of the ideals of type I. We must assume, however, that X is a relatively compact domain of another surface W, and that either the boundary of X in W consists of analytic simple closed curves or every boundary point is an essential singularity of some bounded holomorphic function on X. (Author)
AD-653 800 Not available from CFSTI.

TRAJECTORY OPTIMIZATION TECHNIQUES,
Grumman Aircraft Engineering Corp Bethpage N Y Research Dept
For primary bibliographic entry see Field 22C.
AD-653 812 Not available from CFSTI.

ESTIMATION IN MULTIVARIATE ANALYSIS.
Technical rept.,
Harvard Univ Cambridge Mass Dept of Statistics
A. P. Dempster. 18 Apr 67, 23p Rept no. TR-16
Contracts Nonr-1866 (37), AF 33 (615)-3016
Availability: Published in Multivariate Analysis p315-34 1966.

Descriptors: (*Multivariate analysis, Statistical analysis), Random variables, Sampling, Correlation techniques, Mathematics, Matrix algebra, Transformations (Mathematics).
Identifiers: Jackknife method.

Various methodologies of statistical estimation are compared in the special context of estimating the parameters of a multivariate normal population from a random sample of size n. At the close of Section 2, after comparing these methodologies, a practical approach is suggested which relies on an adaptation of the jackknife method of Tukey. In Section 3 this approach is developed in the particular area of canonical correlation analysis. The discussion of Section 3 is asymptotic in the sense that the aim is to provide satisfactory methods of estimation in moderately large samples. (Author)
AD-653 818 Not available from CFSTI.

CONJUGATES AND LEGENDRE TRANSFORMS OF CONVEX FUNCTIONS,
Princeton Univ N J Dept of Mathematics
R. T. Rockafellar. 19 Oct 65, 9p
AFOSR-67-1390
Grant AF-AFOSR-1165-66
Availability: Published in Canadian Journal of Mathematics v19 p200-5 1967.

Descriptors: (*Functions, Transformations (Mathematics)), Mapping (Transformations), Calculus of variations, Dynamics, Mathematics, Theorems.
Identifiers: Legendre transformation.

This paper discusses how Fenchel's conjugacy correspondence for convex functions may be viewed as a generalization of the Legendre transformation, which is important in the calculus of variations, especially dynamics. It is hoped that the classical analysis of certain problems can be extended to new areas, such as control theory, by means of this generalization. Essentially, the conjugate reduces to the Legendre transformation if and only if the subdifferential of the convex function is one-to-one mapping.
AD-653 820 Not available from CFSTI.

THE GENERAL SPACE-MOMENTUM COMMUTATION RELATION.
Research paper,
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
David M. Rosenbaum. Jun 67, 24p Rept no. RP-P-326
IDA/HQ-67-5985
Contract DAHC15-67-C-0011

Descriptors: (*Operators (Mathematics), Quantum mechanics), Functions, Transformations (Mathematics), Identities, Mathematics.
Identifiers: Commutation relations.

The paper derives the general commutator (q to the mth power, p to the nth power) for all integer m and n, positive or negative. Two new identities for the binomial coefficients are derived using the general commutator. A simple example of the use of the general commutation relations is given in the expansion of (Ap + Bq) to the nth power (A, B, constants) in normal form for integer n. (Author)
AD-653 836 HC$3.00 MF$0.65

COMPLEMENTARY PIVOT THEORY OF MATHEMATICAL PROGRAMMING.
Technical rept.,
Stanford Univ Calif Operations Research House
Richard W. Cottle, and George B. Dantzig. Apr 67, 39p Rept no. TR-67-2
Contracts N00014-67-A-0112-0011, DAHC04-67-C-0028
Research supported in part by AEC, Contract AT (04-3)-326, and NSF, grants NSF-GP-3739 and NSF-GP-6431.

Descriptors: (*Mathematical programming, Mathematics), Inequalities, Linear programming, Quadratic programming, Game theory, Equations, Theorems, Matrix algebra.

Problems of the form: Find w and z satisfying w = q + Mz, w = or > 0, z = or > 0, zw = 0 play a fundamental role in mathematical programming. This paper describes the role of such problems in linear programming, quadratic programming and bimatrix game theory and reviews the computational procedures of Lemke and Howson, Lemke, and Dantzig and Cottle. (Author)
AD-653 874 HC$3.00 MF$0.65

RECONSTRUCTING PATTERNS FROM SAMPLE DATA.
Technical rept.,
Stanford Univ Calif Dept of Statistics
Paul Switzer. 23 May 67, 36p Rept no. TR-126
Contract Nonr-225 (52)

Descriptors: (*Sampling, Mathematical models), Random variables, Mathematics, Theorems, Probability, Pattern recognition, Statistical analysis.
Identifiers: Euclidean space.

A Euclidean region is partitioned in an unknown way into a known number of subregions. For a discrete set of points in the region we may observe into which subregion they each fall. The problem is to obtain an estimated reconstruction of the partition based on the observations. Section 1 outlines a probabilistic approach to the problem and defines criteria of goodness for an estimated reconstruction. Section 2 evaluates the performance of nearest-point rules. Section 3 examines the effect of sample-size and compares several arrangements of the data points. Section 4 proposes a modification of nearest-point procedures having a certain optimality property. Section 5 is more or less independent of the earlier sections; it explores several probabilistic partitioning models. (Author)
AD-653 877 HC$3.00 MF$0.65

ON AN EARTHQUAKE AND AFTERSHOCK MECHANISM RELATING TO A MODEL OF THE CRUST AND MANTLE,
California Univ Berkeley Office of Research Services
For primary bibliographic entry see Field 8K.
AD-653 880 HC$3.00 MF$0.65

HARMONIC FIELDS WITH GIVEN BOUNDARY BEHAVIOR IN RIEMANNIAN SPACES,
California Univ Los Angeles
Mitsuru Nakai, and Leo Sario. 2 Jun 66, 19p
AROD-1517:97
Grant DA-ARO (D)-31-124-G742
Prepared in cooperation with Nagoya Univ. (Japan).
Availability: Published in Journal d Walyse Mathematique v18 p245-57 1967.

Descriptors: (*Algebraic topology, *Complex variables), Boundary value problems, Theorems, Mathematics, Inequalities, Topology.
Identifiers: Harmonic fields.

In his theory of differentials, Ahlfors introduced a complete array of classes of differentials of finite norm. An important role was played by differentials of the second kind, i.e., harmonic fields with given singularities. The existence of such fields in Riemannian spaces had been established by Kodaira. In contrast, nothing seems to be known about the existence of harmonic fields with given behavior in a neighborhood of the ideal boundary. A complete solution is given to the problem in arbitrary Riemannian n-spaces and, as a special case, on Riemann surfaces. (Author)
AD-653 886 Not available from CFSTI.

WEAKLY ALMOST PERIODIC FUNCTIONS ON DISCRETE GROUPS.
Technical rept.,
Washington Univ Seattle
Donald E. Ramirez. Jun 67, 5p
Contract N00014-66-C-0269

Descriptors: (*Groups (Mathematics), *Fourier analysis), Periodic variations, Mathematics, Theorems.

Let gamma be an infinite discrete abelian group. The author shows that the Fourier-Stieltjes transforms on gamma are not uniformly dense in the weakly almost periodic functions on gamma. (Author)
AD-653 894 HC$3.00 MF$0.65

ON THE EXISTENCE OF NON-TANGENTIAL LIMITS OF SUBHARMONIC FUNCTIONS,
Washington Univ Seattle
Maynard Arsove, and Alfred Huber. 24 Jul 65, 10p
AFOSR-67-1355
Grant AF-AFOSR-936-65
Prepared in cooperation with Eidgenoessische Technische Hochschule, Zurich (Switzerland).
Availability: Published in Journal London Math. Soc., v42 p125-32 1967.

Descriptors: (*Potential theory, Mathematics), Theorems, Equations.
Identifiers: Harmonic functions, Density functions.

Our objective here is to establish the existence almost everywhere of non-tangential limits under rather simple growth-rate conditions on the modulus of a density function which are fundamently different from the results obtained by Tolsted. Two theorems are proven.
AD-653 895 Not available from CFSTI.

NEW METHOD FOR OBTAINING EMISSION COEFFICIENTS FROM EMITTED SPECTRAL INTENSITIES. PART I. CIRCULARY SYMMETRIC LIGHT SOURCES,
Northrop Aircraft Inc Hawthorne Calif
For primary bibliographic entry see Field 20F.
AD-653 896 Not available from CFSTI.

HOLOMORPHIC FUNCTIONS AND HAUSDORFF DIMENSION,
California Univ Riverside
Victor L. Shapiro. 23 Mar 67, 19p
AFOSR-67-1369
Grant AF-AFOSR-694-64
Availability: Published in Arkiv foer Matematik v7 n2 p33-48 1967.

Descriptors: (*Functions, Mathematics), Theorems, Equations, Inequalities.
Identifiers: Hausdorff dimension.

Two classes, called A subscript alpha and B subscript alpha, of functions defined on the unit disc are exhibited with the following property: A necessary and sufficient condition that a relatively closed set E contained in D (0,1) be a removable set for the class A subscript alpha, 1 = or < alpha = or < 2, is that the Hausdorff dimension of E be = or < alpha. Furthermore, the sufficiency condition is in a certain sense best possible, i.e., it is false for the class B subscript alpha. (Author)
AD-653 907 Not available from CFSTI.

DYNAMICAL EQUATIONS FOR OPTIMAL NONLINEAR FILTERING,
Brown Univ Providence R I Div of Applied Mathematics
H. J. Kushner. 1967, 14p
AFOSR-67-1352
Grant AF-AFOSR-693-64
Availability: Published in Journal of Differential Equations v3 n2 p179-90 Apr 1967.

Descriptors: (*Differential equations, Stochastic processes), Mathematics, Theorems, Integral equations.
Identifiers: Optimal nonlinear filtering.

In this paper, the author proves a result in optimal nonlinear filtering (and representation of a conditional expectation as a solution to a stochastic differential equation). Some possible computational methods are briefly discussed.
AD-653 910 Not available from CFSTI.

ANGULAR FUNCTIONS FOR A THREE-NUCLEON SYSTEM,
New South Wales Univ Kensington (Australia) Dept of Applied Mathematics
For primary bibliographic entry see Field 20H.
AD-653 911 Not available from CFSTI.

MATRIX ELEMENTS FOR A THREE-NUCLEON SYSTEM (I),
New South Wales Univ Kensington (Australia) Dept of Applied Mathematics
For primary bibliographic entry see Field 20H.
AD-653 912 Not available from CFSTI.

MATRIX ELEMENTS FOR A THREE-NUCLEON SYSTEM (II),
New South Wales Univ Kensington (Australia) Dept of Applied Mathematics
For primary bibliographic entry see Field 20H.
AD-653 914 Not available from CFSTI.

WILCOXON CONFIDENCE INTERVALS FOR LOCATION PARAMETERS IN THE DISCRETE CASE,
Boston Univ Mass
Gottfried E. Noether. 1967, 8p
AFOSR-67-1409
Grant AF-AFOSR-62-369
Prepared in cooperation with Vienna Univ. (Austria).
Availability: Published in Journal of the American Statistical Association v62 p184-8 Mar 1967.

Descriptors: (*Statistical analysis, *Population (Mathematics)), (*Probability, *Sampling), Accuracy, Random variables, Symbols, Sequences, Convergence, Statistical tests, Statistical distributions.

The paper surveys results about the behavior of nonparametric methods in cases where the customary continuity assumptions are not satisfied. A projection approach is used to show that true confidence coefficients associated with confidence intervals for appropriate location parameters derived from Wilcoxon one- and two-sample tests are at least equal to the nominal level for the continuous case, if the confidence intervals are considered closed, at most equal to the nominal level, if they are considered open. The results are interpreted in terms of tests of hypotheses.
AD-653 915 Not available from CFSTI.

THREE-DIMENSIONAL FIELDS PRODUCED BY A VOLTERRA DISLOCATION IMBEDDED IN A LAYERED HALF-SPACE: ANALYTICAL REPRESENTATION OF A SEISMIC MECHANISM,
California Univ Berkeley Office of Research Services
For primary bibliographic entry see Field 8K.
AD-653 920 HC$3.00 MF$0.65

AN ADAPTIVE METHOD OF TEST SELECTION IN SYSTEM DEVELOPMENT,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 12B.
AD-653 942 HC$3.00 MF$0.65

ON THE PROBLEM OF INTERPOLATING DERIVATIVES OF THE GRAVITY POTENTIAL IN A MOUNTAINOUS REGION.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8E.
AD-653 958 HC$3.00 MF$0.65

SIMULTANEOUS TESTS FOR THE EQUALITY OF COVARIANCE MATRICES AGAINST CERTAIN ALTERNATIVES,
Aerospace Research Labs Wright-Patterson AFB Ohio
P. R. Krishnaiah. Mar 67, 19p Rept no. ARL-67-0044

Descriptors: (*Multivariate analysis, Mathematics), Tests, Simultaneous equations, Population (Mathematics), Equations, Theorems.

The paper considers the problem of testing for the equality of covariance matrices against certain alternatives when the underlying populations are multivariate normal. The alternative hypotheses considered are at least one covariance matrix is not equal to the covariance matrix of the next population, at least one covariance matrix is not equal to the covariance matrix of the standard population and at least one covariance matrix is not equal to the covariance matrix of another population. (Author)
AD-653 968 HC$3.00 MF$0.65

THE RESONANCE FREQUENCY OF AN ANISOTROPIC FERROMAGNET.
Emmanuel Coll Boston Mass Oriental Science Library
For primary bibliographic entry see Field 20C.
AD-653 969 HC$3.00 MF$0.65

DISTRIBUTIONS AND THE BOUNDARY VALUES OF ANALYTIC FUNCTIONS,
Grumman Aircraft Engineering Corp Bethpage N Y Research Dept
M. R. Wohlers, and E. J. Beltrami. May 67, 126p
AFOSR-67-1272
Contract AF 49 (638)-1512
Availability: Hard copy available from Academic Press, Inc. 111 Fifth Avenue, New York, N. Y. $6.50.

Descriptors: (*Functional analysis, Analytic functions), (*Boundary value problems, Analytic functions), Harmonic analysis, Integral transforms, Topology, Matrix algebra, Algebras, Groups (Mathematics), Measure theory.

The volume succeeds in covering, in a highly compact format, virtually every important feature of harmonic analysis, while presenting the material at an introductory level throughout. To make the survey simple and self-contained, the author has wherever possible defined concepts and given proofs in great detail. The Fourier Transform on the Real Line for Functions in L sub 1. The Fourier Transform on the Real Line for Functions in L sub 2. Regular Points and Spectrum. More on the Gel'fand Theory and an Introduction to Point Set Topology. Further Topological Notions. Compactness of the Space of Maximal Ideals over a Banach Algebra. An Introduction to Topological Groups and Star Algebras. The Quotient Group of a Topological Group and Some Further Topological Notions. Right Haar Measures and the Haar Covering Function. The Existence of a Right Invariant Haar Integral Over any Locally Compact Topological Group. The Daniell Extension from a Topological Point of View, Some General Results from Measure Theory, and Group Algebras. Characters and the Dual Group of a Locally Compact, Abelian, Topological Group. Generalization of the Fourier Transform to L sub 1 (G) and L sub 2 (G).
AD-653 975 Not available from CFSTI.

DEGREE CONSTRAINED SUBGRAPHS OF LINEAR GRAPHS.
Technical rept.,
Michigan Univ Ann Arbor Systems Engineering Lab
Robert J. Urquhart. May 67, 161p Rept no. SEL-TR-67-12, 06920-10-T
Contract AF 30 (602)-3546

Descriptors: (*Graphics, Linear programming), Algorithms, Combinatorial analysis, Topology.

The most general problem solved in this thesis is the 'degree constrained subgraph problem', in which each vertex has a separate upper and lower degree constraint. The factors problem is a special case, where the upper and lower constraints are equal at each vertex. Efficient algorithms for these cases have not previously appeared in the literature. The growth of an algorithm can be measured by its asymptotic behavior with increasing problem size. The algorithms presented here have algebraic growth (n to the k power) with increasing number of vertices (n). The approach taken to solve these problems is characterized by the use of linear programming theory, both to motivate the algorithm, and to demonstrate the optimality of a solution. The graphical problem is first stated as an integer program. The explicit integer constraints are removed and sufficient linear constraints are added to produce a linear program whose associated convex polyhedron has strictly integer vertices. This work is shown to be applicable to large scale system design, parallel processing, scheduling, and selection of optimum routings. (Author)
AD-653 976 HC$3.00 MF$0.65

EARTH EXPANSION; GENERAL RELATIVITY; PROBLEMS OF ABSTRACT ALGEBRA.
Hamburg Univ (Germany)
For primary bibliographic entry see Field 8G.
AD-653 981 HC$3.00 MF$0.65

OPTIMUM SMOOTHING OF AERIAL GRAVITY MEASUREMENTS,
Ohio State Univ Columbus Dept of Geodetic Science
For primary bibliographic entry see Field 8E.
AD-654 008 HC$3.00 MF$0.65

SINGULAR POINTS OF PLANAR ORDINARY DIFFERENTIAL SYSTEMS,
Texas Univ Austin Dept of Electrical Engineering
J. K. Aggarwal. 14 Feb 66, 14p
AFOSR-67-1347
Grant AF-AFOSR-766-67
Availability: Published in Journal of Differential Equations v3 n2 p203-13 Apr 1967.

Descriptors: (*Differential equations, Mathematics), Theorems, Stability.
Identifiers: Singularity.

The behavior of trajectories in the neighborhood of an isolated singular point at the origin for various special cases of the differential equations where X (0,0)=0 and Y (0,0)=0, has been the subject of study since Poincare. His contribution towards the analysis of the system where ad - bc does not equal 0, a, b, c, d, f, and g are real, and f, g are power series in x and y with no terms of degree < 2, is well known. References (3), (6), and (8) describe some of the more significant contributions to the study of singular points, and give a fairly complete bibliography on the subject. In the present paper, the behavior of the trajectories for 2 given differential equations are investigated.
AD-654 024 Not available from CFSTI.

APPLICATION OF THE KALMAN FILTER TO SEQUENTIAL OPTIMAL PARAMETER ESTIMATION VIA HOUSEHOLDER'S MATRIX INVERSION METHOD.
Special rept.,
Army Test and Evaluation Command White Sands Missile Range N Mex Deputy for National Range Operations
James Pappas. Jun 67, 101p Rept no. RO-S-67-1

Descriptors: (*Control systems, Optimization), (*Stochastic processes, theory), Equations, Least squares method, Matrix algebra, Vector spaces.
Identifiers: Optimal control theory, On-line systems.

A detailed derivation of the computable discrete equations for parameter estimation are developed in a geometrical vector-space setting for the state-space novice. Classical least squares curve fitting when approached with Kalman's sequential prediction-correction techniques look like state-vector feedback control problems. It is hoped that this paper will help bridge the gap between some of the modern and classical theory of systems analysis. (Author)
AD-654 027 HC$3.00 MF$0.65

CRYSTALLITE SIZE DISTRIBUTIONS FROM X-RAY POWDER LINE PROFILES.
Georgia Inst of Tech Atlanta Engineering Experiment Station
For primary bibliographic entry see Field 7D.
AD-654 051 Not available from CFSTI.

PROPAGATION OF SOME SYSTEMATIC ERRORS IN X-RAY LINE PROFILE ANALYSIS.
Technical rept.,
Georgia Inst of Tech Atlanta Engineering Experiment Station
R. A. Young, R. J. Gerdes, and A. J. C. Wilson. 18 Feb 66, 13p Rept no. TR-4
Contract Nonr-991 (09)
Availability: Published in Acta Crystallographica v22 pt2 p155-62 Feb 1967.

Descriptors: (*Mathematical analysis, *X rays), Errors, Sampling, Statistical analysis, Count-rate meters, Background, Fourier analysis, Series, Optimization, Distribution functions, Crystallography.

Three systematic errors in x-ray line profile analysis are treated: uncorrected constant background, truncation and the effect of sampling the observed profile at a finite number of points. The effect of these errors on Fourier coefficients and on the crystallite size distribution function is presented. (Author)
AD-654 052 Not available from CFSTI.

MINIMIZATION OF THE VARIANCE OF PARAMETERS DERIVED FROM X-RAY POWDER DIFFRACTOMETER LINE PROFILES.
Georgia Inst of Tech Atlanta Engineering Experiment Station
For primary bibliographic entry see Field 7D.
AD-654 053 Not available from CFSTI.

ON THE CLOSURE OF CHARACTERS AND THE ZEROS OF ENTIRE FUNCTIONS,
Institute for Advanced Study Princeton N J
Arne Beurling, and Paul Malliavin. 21 Dec 66, 18p
AFOSR-67-1418
Grant AF-AFOSR-1071-66
Availability: Published in Acta Mathematica v118 p79-93 1967.

Descriptors: (*Functions, Number theory), Exponential functions, Mathematical analysis, Theorems, Mathematics.
Identifiers: Harmonic functions.

This paper is concerned mainly with the distribution of zeros of entire functions of exponential type satisfying the condition that the integral between the limits -infinity to+infinity of the absolute value of (log (absolute value of f (x))), multiplied by dx/ 1+x squared, the whole thing < infinity.
AD-654 075 Not available from CFSTI.

ON THE OSCILLATION OF SOLUTIONS OF A SECOND-ORDER LINEAR DIFFERENTIAL EQUATION,
Western Reserve Univ Cleveland Ohio
A. Samanich Skidmore, and Walter Leighton. Sep 65, 12p
AROD-2828:14
Grant DA-ARO (D)-31-124-G600
Availability: Published in Circolo Matematico di Palermo Ser2 v14 p1-8 1965.

Descriptors: (*Differential equations, Periodic variations), Oscillation, Theorems, Mathematics, Bessel functions, Equations, Inequalities.

Necessary conditions and sufficient conditions are given that a nonnull solution of a differential system the second derivative of y with respect to $x + p(x)y = 0$, $y(a) = 0$, have n zeros on an interval $a < x = or < b$. The function p (x) is assumed to be positive, of class C', and usually either concave or convex on the interval (a, b). Theorem 1 is wholly new, while Theorems 2-5 are extensions of earlier results.
AD-654 086 Not available from CFSTI.

A HEURISTIC MODEL FOR SCHEDULING LARGE PROJECTS WITH LIMITED RESOURCES.
California Univ Los Angeles Western Management Science Inst
For primary bibliographic entry see Field 12B.
AD-654 098 Not available from CFSTI.

ON SELECTING VARIABLES FOR PATTERN CLASSIFICATION.
Technical rept.,
Information Research Associates Inc Lexington Mass
Poduri S. R. S. Rao. 19 Jun 67, 21p Rept no. IRA-TR-11, IRA-100:19
Contract Nonr-4752 (00)

Descriptors: (*Pattern recognition, *Statistical analysis), Artificial intelligence, Automata, Mul-

tivariate analysis, Control, Cybernetics, Data processing systems, Information theory, Decision theory.

The purpose of this report is two-fold. When the separating boundary between two pattern classes is a hyperplane, the effects of positive and negative correlations (between the variables used to construct the hyperplane) on the probability of misclassification are investigated. Secondly, a method for including or rejecting the variables in the hyperplane for a desired proportional gain at every stage is presented. (Author)
AD-654 149 HC$3.00 MF$0.65

INEQUALITIES AND TOLERANCE LIMITS FOR s-ORDERED DISTRIBUTIONS.
Research rept.,
California Univ Berkeley Operations Research Center
Michael J. Lawrence. Nov 66, 61p Rept no. ORC-66-37
Contract Nonr-3656 (18)

Descriptors: (*Distribution theory, Statistical analysis), Inequalities, Acceptability, Random variables, Mathematics, Theorems.
Identifiers: Robust procedures, Order statistics.

Define F < (subscript s) G F < (subscript r) G if F and G have the same median, say the origin and G (superscript -1) F (x) is concave-convex about the origin (G (superscript -1) F (x)/x is increasing (decreasing) in x positive (negative)). Conservative tolerance limits are derived for distributions which are s-ordered with respect to the Laplace distribution. These are especially reasonable for mensuration data. In addition, many inequalities concerning combinations of order statistics are obtained. These results are useful in robustness studies of tolerance limits, estimates and statistical tests derived for specified distributions such as the normal distribution. Some examples are given. (Author)
AD-654 154 HC$3.00 MF$0.65

A NEW APPROACH TO DISCRETE MATHEMATICAL PROGRAMMING,
California Univ Los Angeles Western Management Science Inst
G. W. Graves, and A. B. Whinston. May 67, 24p Rept no. WMSI Working Paper-117
Contract Nonr-233 (75)
Research supported in part by NSF.

Descriptors: (*Mathematical programming, Algorithms), Mapping (Transformations), Random variables, Statistical analysis, Optimization, Mathematics, Theory.

The paper presents an algorithm for solving the zero-one integer programming problem. In contrast to the usual approach, which reduces the problem to finding the optimal values for variables restricted to values of zero and one, we view the problem as finding an optimal map among a class of mappings of one finite set into another. The basic approach is to characterize the statistical structure of the finite class of maps. Our technique consists of trying to identify the optimal feasible map in a class of maps, by introducing random variables as functionals on the class of maps. We derive explicitly the statistical properties of the class of maps associated with the zero-one integer programming problem. Using the mean and variance-covariance matrix the idea of confidence level enumeration is developed. (Author)
AD-654 162 HC$3.00 MF$0.65

TABLES OF JOINT PROBABILITIES USEFUL IN EVALUATING MIXED ACCEPTANCE SAMPLING PLANS.
Technical rept.,
Rutgers - the State Univ New Brunswick N J Statistics Center
E. G. Schilling, and H. F. Dodge. May 67, 61p Rept no. TR-N-28
Contract Nonr-404 (18)
See also AD-654 179, suppl.

Descriptors: (*Sampling, Probability), Statistical analysis, Tables, Quality control, Acceptability, Mathematics.

The report provides tables for the evaluation of OC curves and associated measures of dependent mixed variables-attributes sampling plans for the case of single specification limit, known standard deviation, assuming a normal distribution. The tables give values of the joint probability of a sample mean greater than some limit A and exactly i defectives in a sample, for sample sizes 4 to 10, values of i=0,1,2 and fraction defective p = .005, .01, .02, .05, .10, .15, .20. (Author)
AD-654 178 HC$3.00 MF$0.65

SUPPLEMENT TO TABLES OF JOINT PROBABILITIES.
Technical rept.,
Rutgers - the State Univ New Brunswick N J Statistics Center
E. G. Schilling, and H. F. Dodge. Jun 67, 26p Rept no. TR-N-29
Contract Nonr-404 (18)
See also AD-654 178 - Basic report.

Descriptors: (*Sampling, Probability), Statistical analysis, Tables, Quality control, Acceptability, Mathematics.

The report supplements AD-654 178. It provides additional tables of the joint probability of a sample mean greater than some limit A and exactly i defectives in a sample of n1 for samples taken from a standard normal distribution. Values are presented for i = 0 with sample sizes 11 to 20 and population fraction defective p = .005, .01, .02, .05, .10, .15, .20.
AD-654 179 HC$3.00 MF$0.65

STOCHASTIC PROBLEMS IN TRANSPORT THEORY,
Argonne National Lab., Ill.
Peter John Brockwell. Aug 66, 142p
Contract W-31-109-eng-38

Descriptors: (*Integral equations, *Stochastic processes), Theses, Sequences, Iterations, Probability, Photons, Scattering, Integral equations, Problem solving, Numerical analysis, Theorems, Operators (Mathematics), Population (Mathematics).

For abstract, see NSA 21 13.
ANL-7131 HC$3.00 MF$0.65

ON THE USE OF CERTAIN FIRST INTEGRALS OF THEORETICAL MECHANICS IN SPACE PROBLEMS.
European Space Vehicle Launcher Development Organization, Paris (France). Basic Techniques Div.
For primary bibliographic entry see Field 22C.
For abstract, see STAR 05 15.
N67-27928 HC$3.00 MF$0.65

THE SOLUTION OF THE EULERIAN GYROSCOPE EQUATIONS BY MEANS OF LIE SERIES MAKING USE OF RECURRENCE FORMULAS.
Innsbruck Univ. (Austria). Inst. of Theoretical Physics.
A. Schett, and J. Weil. 1966, 21p NASA-CR-84655, SR-14
Contract NGR-52-046-001

Descriptors: *Euler equation, *Gyroscope, *Lie group, Calculation, Differential, Equation, Formula, Motion, Numerical, Recurrence, Solution.

For abstract, see STAR 05 15.
N67-28009 HC$3.00 MF$0.65

TECHNIQUES AND ERRORS IN MEASURING CROSS- CORRELATION AND CROSS-SPECTRAL DENSITY FUNCTIONS.
Measurement Analysis Corp., Los Angeles, Calif.
For primary bibliographic entry see Field 9D.
For abstract, see STAR 05 15.
N67-28373 HC$3.00 MF$0.65

METHOD OF DETERMINING POINTS OF INFLEXION OF FUNCTIONS FROM THEIR GRAPHS.
Defence Research Board, Ottawa (Ontario).
G. G. Rempel. Oct 66, 4p T-467-R, AD-649524
Transl. Into English From Geol. I Geofiz., Akad. Nauk Ssr, Sibirsk, Otd. (Novosibirsk), V. 5, 1966 P 172-173

Descriptors: *Analytic function, *Graph, Analysis, Anomaly, Curvature, Electric, Function, Gravity, Inflection, Magnetic, Mathematics, Point.

For abstract, see STAR 05 15.
N67-28562 HC$3.00 MF$0.65

RECURSION FORMULAS FOR THE COEFFICIENTS OF THE F AND G SERIES.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
R. H. Estes, and E. R. Lancaster. Jun 67, 6p NASA-TM-X-55805, X-643-67-255

Descriptors: *Power series, *Recursion formula, Angular, Body, Coefficient, Equation, Formula, Momentum, Motion, Time, Two.

For abstract, see STAR 05 15.
N67-28678 HC$3.00 MF$0.65

QUASILINEAR FORMULATION OF FINITE TRANSFORMATIONS.
Analytical Mechanics Associates, Inc., Uniondale, N. Y.
H. Wolf. Dec 64, 11p NASA-CR-84821
Contract NAS5-9085

Descriptors: *Linear transformation, *Orbit calculation, Calculation, Coordinate, Coordinate transformation, Equation, Finite, Formula, Linear, Nonlinear, Orbit, Position, Quadratic, Quasi-linear, Transformation, Vector, Velocity.

For abstract, see STAR 05 15.
N67-28759 HC$3.00 MF$0.65

ESTIMATION OF STATE WITH ACCEPTABLE ACCURACY CONSTRAINTS INTERIM REPORT.
Analytical Mechanics Associates, Westbury, N. Y.
S. F. Schmidt. Jan 67, 23p NASA-CR-84795, REPT.-67-4
Contract NAS5-9085

Descriptors: *Orbit calculation, *State vector, *Variance, Accuracy, Calculation, Error, Lunar, Orbit, Problem, Solution, State, Vector.

For abstract, see STAR 05 15.
N67-28763 HC$3.00 MF$0.65

STUDY ON DETERMINING STABILITY DOMAINS FOR NONLINEAR DYNAMICAL SYSTEMS QUARTERLY PROGRESS REPORT, 1 MAY - 1 AUG. 1966.
Grumman Aircraft Engineering Corp., Bethpage, N. Y.

G. Geiss. 15 Aug 66. 17p NASA-CR-84817, RM-334
Contract NAS8-20306

Descriptors: *Algorithm, *Nonlinear system, *Problem solving, Domain, Dynamic, Equilibrium, Formulation, Mathematics, Nonlinear, Numerical, Problem, Solution, Stability, System.

For abstract, see STAR 05 15.
N67-28767 HC$3.00 MF$0.65

OPTIMUM PROCESSES IN SYSTEMS WITH DISTRIBUTED PARAMETERS AND SOME PROBLEMS OF INVARIANCE THEORY.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A. I. Yegorov. Mar 67. 91p NASA-TM-X-59819, RSIC-649
Center, Mar. 1967 91 P Refs Transl. Into English From Izv. Akad. Nauk Sssr, Ser. Mat. (Moscow), V. 29, No. 6, 1965 P 1205-1260 Jointly Supported By Army Missile Command

Descriptors: *Control system, *Invariance, *Optimal control, Calculus, Control, Differential, Ellipse, Equation, Hyperbola, Lipschitz condition, Nonlinear, Optimal, Parabola, Partial, System, U.S.S.R., Variation, Vector.

For abstract, see STAR 05 15.
N67-28791 HC$3.00 MF$0.65

OPTIMAL COMPUTING FORMS FOR THE TWO-BODY C AND S SERIES.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
C. R. Herron, E. R. Lancaster, and W. R. Trebilcock. May 67. 20p NASA-TM-X-55799, X-643-67-239

Descriptors: *Approximation method, *Computation, *Two-body problem, Approximation, Body, Form, Function, Mathematics, Method, Polynomial, Problem, Table, Two.

For abstract, see STAR 05 15.
N67-28798 HC$3.00 MF$0.65

STUDY ON DETERMINING STABILITY DOMAINS FOR NONLINEAR DYNAMICAL SYSTEMS - II QUARTERLY PROGRESS REPORT, 1 AUG. - 31 OCT. 1966.
Grumman Aircraft Engineering Corp., Bethpage, N. Y.
J. V. Abbate, G. R. Geiss, and R. Mc Gill. 15 Nov 66. 22p NASA-CR-84840, RM-348
Contract NAS8-20306

Descriptors: *Algorithm, *Dynamic stability, *Nonlinear system, Algebra, Determination, Dynamic, Guidance, Loop, Matrix, Modification, Nonlinear, Parameter, Region, Set, Stability, System, Theory, Time.

For abstract, see STAR 05 15.
N67-28824 HC$3.00 MF$0.65

COMPUTATION OF OPTIMAL CONTROLS BY A METHOD BASED ON SECOND VARIATIONS.
Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
T. E. Bullock. Dec 66. 97p NASA-CR-84847, SUDAAR-297
Grant NSG-133-61

Descriptors: *Optimal control, *Problem solving, *Variational calculus, Algebra, Calculus, Computation, Constraint, Control, Dynamics, Iteration, Linearity, Method, Optimal, Problem, Second, Sequence, Solution, Terminal, Variation.

For abstract, see STAR 05 15.
N67-28831 HC$3.00 MF$0.65

AN INTEGRAL EQUATION APPROACH TO SECOND VARIATION TECHNIQUES FOR OPTIMAL CONTROL PROBLEMS.
Toronto Univ. (Ontario). Dept. of Industrial Engineering.
B. Bernholtz, and G. S. Tracz. 1967, 34p
Sponsored By Natl. Res. Council of Canada

Descriptors: *Approximation method, *Fredholm integral equation, *Iterative solution, *Optimal control, Algorithm, Approximation, Control, Current, Differential, Equation, Fixed, Function, Iteration, Linear, Matrix, Method, Numerical, Optimal, Order, Point, Quadratic, Second, Solution, System, Terminal, Trajectory, Weighting.

For abstract, see STAR 05 15.
N67-28864 HC$3.00 MF$0.65

COARSE-GRAINED QUANTITIES IN APERIODIC SYSTEM. II - FREQUENCY SPECTRA OF APERIODIC CHAINS.
Kyoto Univ. (Japan). Research Inst. for Fundamental Physics.
H. Matsuda, and N. Ogita. Jan 67. 27p RIFP-60

Descriptors: *Frequency, *Histogram, *Markov chain, Aperiodic, Chain, Distribution, Equation, Harmonic, Isotope, Motion, Oscillator, Periodicity, Spectrum.

For abstract, see STAR 05 15.
N67-28871 HC$3.00 MF$0.65

MATHEMATICS DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING DECEMBER 31, 1966,
Oak Ridge National Lab., Tenn.
Manuel Feliciano, Jr. Apr 67. 127p
Contract W-7450-eng-26

Descriptors: (*Numerical analysis, Algorithms), (*Curve fitting, Computers), Programming (Computers), Nuclear reactors, Nuclear engineering.

For abstract, see NSA 21 13.
ORNL-4083 HC$3.00 MF$0.65

NUMERICAL APPROXIMATION OF GREEN'S FUNCTIONS AND RESOLVENT KERNELS.
Technical rept.,
Montana Univ., Missoula. Computer Center.
Darrel L. Choate. May 67. 127p TR-8
Grant NSF-GP-5808

Descriptors: (*Green's function, Numerical methods and procedures), Theses, Numerical analysis, Differential equations, Boundary value problems, Approximation (Mathematics), Matrix algebra, Mathematics, Integral equations.

In this paper the author numerically approximates Green's functions arising from linear differential equations and their boundary conditions and resolvent kernels which arise from linear Fredholm integral equations of the second kind. (Author)
PB-14 867 HC$3.00 MF$0.65

A TABLE FOR COMPUTATIONS OF ARRAY FUNCTIONS USING FINITE Z-TRANSFORMS.
Institutes for Environmental Research, Boulder, Colo.
For primary bibliographic entry see Field 9E.
PB-174 843 HC$3.00 MF$0.65

12B. OPERATIONS RESEARCH

SINGULAR EXTREMALS,
Grumman Aircraft Engineering Corp Bethpage N Y Research Dept
Richard E. Kopp, H. Gardner Moyer, and Henry J. Kelley. Jun 67. 22p
AFOSR-67-1340
Contracts AF 49 (638)-1207, AF-49 (638)-1512
Prepared in cooperation with Analytical Mechanics Associates, Inc., Westbury, N. Y. See also AD-646 814.
Availability: Published in Topics in Optimization p63-101 1967.

Descriptors: (*Calculus of variations, Optimization), (*Servomechanisms, Synthesis), Differential equations, Control systems, Transformations (Mathematics), Sequences, Problem solving, Inequalities, Hamiltonian.

Singular extremals are usually associated with variational problems which have the control variables appearing linearly in the system differential equations--singular arcs or subarcs arising when the pseudo-Hamiltonian function is not explicitly a function of the control variable over a nonzero time interval. When such a situation occurs, neither the maximum principle nor the classical variational theory provide adequate tests for minimality of the arc. The present chapter will derive conditions for minimality of singular arcs over short intervals of time. The derivative material is taken mainly from four previous papers by the authors, with extensions and considerations of the interrelationships of the two following approaches: first, a second variation test for singular subarcs employing special control variations, and second, a transformation approach to the analysis of singular subarcs. No pretense of complete treatment can be made since difficult questions on the number and sequence of singular and nonsingular subarcs remain unanswered; however, some material on junction conditions for singular arcs is included. The problem of synthesizing solutions containing singular subarcs is not considered.
AD-653 425 Not available from CFSTI.

THE INPUT/OUTPUT AND CONTROL SYSTEM OF THE MOORE SCHOOL PROBLEM SOLVING FACILITY.
Pennsylvania Univ Philadelphia Moore School of Electrical Engineering
For primary bibliographic entry see Field 9B.
AD-653 465 HC$3.00 MF$0.65

SIMULTANEOUS MULTIPLE PARAMETER ADJUSTMENT IN ADAPTIVE SYSTEMS USING A SINGLE PERTURBATION SIGNAL.
Yale Univ New Haven Conn Dunham Lab
For primary bibliographic entry see Field 9E.
AD-653 474 HC$3.00 MF$0.65

A NUMERICAL TAXONOMY METHOD TO EVALUATE AND PREDICT EQUIPMENT PERFORMANCE FROM ENVIRONMENTAL ENGINEERING DATA,
Frankford Arsenal Philadelphia Pa
For primary bibliographic entry see Field 5A.
AD-653 621 HC$3.00 MF$0.65

SOME NEW APPROACHES TO RISK.
Research rept.,
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
R. Byrne, A. Charnes, W. W. Cooper, and K. Kortanek. May 67. 51p Rept no. RR-101
Contract Nonr-760 (24)
Prepared in cooperation with Northwestern Univ., Evanston, Ill. Systems Research Group, Contracts Nonr-1228 (10), DA-31-124-ARO (D)-322, Cornell Univ., Ithaca, N. Y., and Duquesne Univ., Pittsburgh, Pa.

Descriptors: (*Probability, Stochastic processes), (*Management planning, *Operations research), Optimization, Linear programming, Uncertainty, Mathematical models, Mathematical analysis.

Relatively recent innovations in methods for risk analysis are here surveyed and related by means

of certain linear programming characterizations applied to venture and risk analysis, stochastic decision trees, stochastic linear programming, linear programming under uncertainty, and chance constrained programming. Possibilities for combining these approaches in various ways are also discussed and illustrated by example. Implications are noted for accounting, budgeting and other aspects of management planning. (Author)
AD-653 727 HC$3.00 MF$0.65

THE STRUCTURE OF ECONOMIC MODELS,
George Washington Univ Washington D C Logistics Research Project
George M. Lady. 15 May 67, 95p Rept no. Serial-T-197
Contract N00014-67-A-0214

Descriptors: (*Economics, Mathematical models), (*Operations research, Mathematical models), Theses, Optimization, Equations, Theorems.

An outline of the report is as follows: Chapter 1 is the introduction. Next, the mathematical tools of the analysis are developed in Chapter 2, namely, aspects of relation theory or the theory of directed graphs. Chapter 3 presents the correspondence between variable structure and the zero and nonzero entries of the coefficient matrix of a system of simultaneous linear equations. Next, two applications of variable structure are examined. Example I concerns the structure of linear models of balanced accounts, in particular the input-output model. Example II concerns the relationship between matrix structure and qualitatively determinate linear systems. Chapter 4 defines the relationship between variable structure and single valued representations (criterion functions) of the set of variables. Particular emphasis is placed upon structures which permit recursive optimization techniques. Example III is an application of the concepts introduced in Chapter 4 to the budgeting problem of Strotz.
AD-653 728 HC$3.00 MF$0.65

OPTIMAL ALLOCATION IN A PURE CAPITAL MODEL WITH WITHDRAWALS: ASYMTOTIC PROPERTIES AND ALGORITHMS.
Stanford Univ Calif Inst for Mathematical Studies in the Social Sciences
For primary bibliographic entry see Field 5A.
AD-653 746 HC$3.00 MF$0.65

APPROXIMATE ALGORITHM FOR THE FIXED CHARGE CAPACITATED SITE LOCATION PROBLEM.
Stanford Univ Calif Operations Research House
For primary bibliographic entry see Field 5C.
AD-653 787 HC$3.00 MF$0.65

ON STRUCTURAL PROPERTIES OF LINEAR, CONSTANT, MULTIVARIABLE SYSTEMS,
Stanford Univ Calif
R. E. Kalman. Jun 66, 12p
AFOSR-67-1376
Contract AF 49 (638)-1440
Availability: Published in Congress of the International Federation of Automatic Control (3rd), London (England), 20-25 Jun 1966, Session 6, Paper 6A p1-9.

Descriptors: (*Control systems, Multivariate analysis), Automation, Theory, Algebra, Matrix algebra, Transfer functions.

The paper is concerned with the precise mathematical description of linear, constant, continuous-time dynamical systems, and various algebraic problems arising therefrom. The precise notations are too complicated to be given here, but the main results are the following: (1) The Smith-Frobenius canonical form for polynomial matrices is applied to the construction of minimal realizations of rational transfer-function matrices. Explicit formulas are obtained. It is shown that the canonical realization consists of an 'inner core' of highly interconnected dynamical elements, as well as two memoryless coding networks, one at the input, one at the output. (2) Sufficient conditions are obtained for noninteraction by forward compensation and it is shown that necessary and sufficient conditions cannot be obtained solely in terms of elementary divisors. (3) The problem of parametrization and degeneracy of constant dynamical systems is formulated and a theorem is proved on the relationship between degeneracy of the external and internal descriptions of a system. (Author)
AD-653 813 Not available from CFSTI.

COMPLEMENTARY PIVOT THEORY OF MATHEMATICAL PROGRAMMING.
Stanford Univ Calif Operations Research House
For primary bibliographic entry see Field 12A.
AD-653 874 HC$3.00 MF$0.65

AN ADAPTIVE METHOD OF TEST SELECTION IN SYSTEM DEVELOPMENT,
Rand Corp Santa Monica Calif
N. H. Hakansson. Apr 67, 58p Rept no. RM-5238-PR
Contract F44620-67-C-0045

Descriptors: (*Test methods, Optimization), (*Decision theory, Operations research), Dynamic programming, Systems engineering, Models (Simulations), Weapon systems, Adaptive systems, Mathematical analysis.

Experience indicates that the major source of uncertainty in weapon system devlopment can be traced to activities involving testing and redesign, yet surprisingly little of a conceptual nature has been done to improve the decisionmaking process involved in performing these activities. An adaptive model of the testing process is constructed that is designed to provide the project director and his staff with a means for determining the best test to perform at a given stage in the development of a system and to enable the same decisionmakers to choose intelligently among the available redesign actions once the test results are known. Although the model is presented in terms of relatively simple systems and tests, it should be capable of handling those of a highly complex nature. (Author)
AD-653 942 HC$3.00 MF$0.65

A HEURISTIC MODEL FOR SCHEDULING LARGE PROJECTS WITH LIMITED RESOURCES.
Revised ed.,
California Univ Los Angeles Western Management Science Inst
Jerome D. Wiest. Aug 66, 23p Rept no. WMSI Reprint-41
Revision of manuscript submitted Mar 66.
Availability: Published in Management Science v13 n6 pB359-77 Feb 1967.

Descriptors: (*Scheduling, Management planning), (*Operations research, Optimization), Computer programs, Flow charting, Construction, Models (Simulations), Systems engineering, Mathematical models.
Identifiers: SPAR-1.

Present PERT-type scheduling models implicitly assume unlimited availability of resources. As most project schedulers are aware, however, activities may be constrained in their start dates by availability of resources as well as by technological orderings. Analytic solutions to the limited-resource, project scheduling problem are infeasible at present for all but small projects; heuristic approaches seem most promising of useful results. One such approach, described here, is a computer model capable of scheduling single or multiple projects within resource limits and other constraints commonly encountered by the project scheduler. The basic formulation of the model is discussed along with its scheduling heuristics which determine the period-by-period allocation of resources to activities in a project. By changing certain parameters and heuristics in the model, one can simulate project scheduling under varying constraints and scheduling rules. Applications of the model to a number of fictitious and real projects are described. (Author)
AD-654 098 Not available from CFSTI.

ECONOMIC THEORY OF INFORMATION (LECTURE NOTES),
California Univ Los Angeles Western Management Science Inst
Jacob Marschak. May 67, 122p Rept no. WMSI Working Paper-118
Contract Nonr-233 (75)
Research supported in part by NSF.

Descriptors: (*Information theory, *Economics), Coding, Statistical analysis, Mathematical analysis, Textbooks, Costs, Operations research, Learning.

Problems of statistical decision and of communication economics are shown to be special cases of the general problem of joint efficient choice of the observable, the code, the channel, and the strategy, given the payoff function and the available resources. (Author)
AD-654 163 HC$3.00 MF$0.65

PROCEDURE FOR INTERPOLATING BIVARIANT DATA INFLUENCED BY RANDOM ERROR,
California Univ., Livermore. Lawrence Radiation Lab.
For primary bibliographic entry see Field 9B.
For abstract, see NSA 21 13.
UCRL-50219 HC$3.00 MF$0.65

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. AIR CONDITIONING, HEATING, LIGHTING, AND VENTILATING

SATURN IB PROGRAM. BUTTER VALVE, 12-INCH, 3-PSIG TEST REPORT.
Chrysler Corp., New Orleans, La. Space Div.
R. N. Marks. 8 Mar 67, 33p NASA-CR-84843, TR-RE-CCSD-FO-1073-3
Contracts NAS8-4016. PT VII, CWO 271620

Descriptors: *Air conditioning, *Control valve, *Flow regulator, *Performance characteristics, Air, Butterfly, Characteristics, Conditioning, Control, Cycle, Flow, Fog, Function, Low temperature, Performance, Pressure, Quality, Regulator, Result, Salt, Test, Valve.

For abstract, see STAR 05 15.
N67-28827 HC$3.00 MF$0.65

13B. CIVIL ENGINEERING

LABORATORY STUDY OF SEICHING INDUCED ON AN OFFSHORE SHELF.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 13J.
AD-653 711 HC$3.00 MF$0.65

HEADWAY AND SWITCHING STRATEGIES FOR AUTOMATED VEHICULAR GROUND TRANSPORTATION SYSTEMS,

Massachusetts Inst. of Tech., Cambridge. Engineering Projects Lab.
For primary bibliographic entry see Field 13F.
PB-173 644 HC$3.00 MF$0.65

SHORT COURSE ON HIGHWAY DEVELOPMENT (1st).
Course held 28 Feb-1 Mar 41.
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
1 Mar 41, 62p
Prepared in cooperation with Ohio Dept. of Highways, Columbus.

Descriptors: (*Roads, *Education), (*Design, *Plants (Botany)), Trees, Recreation, Seeds, Erosion, Costs, Ecology, Maintenance, Soils, Tables, Maps, Rural areas, Grasses, Urban areas, Ohio.

Contents: First short course on highway development; The new program of the Public Roads Administration; What Ohio is doing in the roadside development program; Highways for defense; The highway system; Zoning of roadsides; The ecological approach to roadside planting; What plant material is available as nursery stock; Desirable trees for highway plantings; Roadside parks.
PB-174 808 HC$3.00 MF$0.65

SHORT COURSE ON HIGHWAY DEVELOPMENT (3rd).
Course held 25-26 Feb 43.
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
26 Feb 43, 68p
Prepared in cooperation with Ohio Dept. of Highway, Columbus.

Descriptors: (*Roads, *Education), (*Design, *Plants (Botany)), Grasses, Photography, Maintenance, Soils, Management planning, Seeds, Economics, Trees, Costs, Tables, Maps, Rural areas, Organizations, Urban areas, Ohio.

Contents: The broad pattern of highways, parks and preserves; An experiment in conservation education; The broad program of conservation; What air photography can teach us; Highways and the bombardier; Maintenance of roadside parks for sustaining morale; Planning - constructing - maintaining; Present and post-war planning of roadside development; A highway maintenance engineer's responsibility to the roadside; Earth as it exists on the highways; Turf establishment - soil preparation; Adaptability and uses of various seed varieties to Ohio soils and highway conditions; Seed specifications, seed availability and recommended substitutions; Turf for wear and tear; Mowing as it contributes to good maintenance. (Author)
PB-174 809 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (20th).
Course held 3-6 Oct 61.
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
6 Oct 61, 207p
Prepared in cooperation with Ohio Dept. of Highways, Columbus.

Descriptors: (*Roads, *Education), (*Design, *Plants (Botany)), Recreation, Natural resources, Canada, Ohio, Management planning, Erosion, Seeds, Fertilizers, Herbicides, Sprays, Trees, Urban areas, Grasses, Maintenance.

Contents: The highway and our parks; Roadside improvement is good public relations; Critique of the landscape plans for an interstate highway planting design; Canada's national capital parks; United States national parks and parkways; The state parks of Ohio; Roadside development--its design and protection; Public relations and the highway administrator; Independent roadway design and landscape development; Highway erosion research studies; Mulch as an aid to erosion control; Roadside cover--its establishment and maintenance; Advancement in erosion control protection by seeding; Advancement in erosion control protection by fertilizer; Advancement in erosion control protection by mulching; Advancement in chemical control of vegetation.
PB-174 822 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (21st).
Course held 2-5 Oct 62.
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
5 Oct 62, 165p
Prepared in cooperation with Ohio Dept. of Highways, Columbus.

Descriptors: (*Roads, *Education), (*Design, *Plants (Botany)), Natural resources, Traffic, Safety, Recreation, Trees, Michigan, Management planning, Urban areas, Wisconsin, Clay, Erosion, Ohio, Fertilizers, Grasses, Sprays.

Contents: Roadside values; Ohio roadside council research in highway safety; Critique of the landscape plans for development of a scenic highway; Maine's scenic highway competition award; Organizational protocol and its communications; U.S. forest service recreational developments; Motorist services provided in Ohio's roadside rests; Michigan's program in roadside development; Legislative protection of roadside values; The importance of plant ecology for roadside plantings; Planting the expressway in urban communities; The agronomist and the highway roadside; The Wisconsin red clay interagency committee erosion control project; Ohio's progress report on roadside research; Methods of maintaining and reseeding deteriorated highway slopes; Fertilizers an important factor in establishing and maintaining roadside turf; Mulch as an aid to erosion control; Inhibitors for economic maintenance.
PB-174 823 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (22nd).
Course held 7-11 Oct 63.
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
11 Oct 63, 140p
Prepared in cooperation with Ohio Dept. of Highways, Columbus.

Descriptors: (*Roads, *Education), (*Design, *Plants (Botany)), Puerto Rico, Traffic, Maintenance, Seeds, Herbicides, Costs, Grasses, Natural resources, Ohio, Trees, Fertilizers, Erosion, Organizations, Recreation.

Contents: Working through block clubs; Critique of roadside development competition 1963; Native plant material for roadside planting as used in Arizona; Scenic routes--a new concept in highway improvement; Utah's roadside development program; Puerto Rico's latest development for highways; Optimum landscape development of highways; Indiana's progressive planting program; Restoration of native growth along the interstate highway by hydraulic seeding; Realistic restoration of nature in highway roadside design and maintenance; Inhibtors for economic maintenance.
PB-174 824 HC$3.00 MF$0.65

SHORT COURSE ON ROADSIDE DEVELOPMENT (25th).
Course held 3-7 Oct 66.
Ohio State Univ., Columbus. Dept. of Landscape Architecture.
7 Oct 66, 223p
Prepared in cooperation with Ohio Dept. of Highways, Columbus.

Descriptors: (*Roads, *Education), (*Design, *Plants (Botany)), Wastes (Sanitary engineering), Natural resources, Rural areas, Urban areas, Trees, Traffic, Safety, California, Minnesota, Soil mechanics, Seeds, Grasses, Erosion, Fertilizers.

Contents: Critique of roadside parks 1984 design; K.A.B. can assist your anti-litter program; Highway design--a collaborative effort; Urban highway planting design; Good planting for safe and enjoyable motoring; Landscape development and highway safety; Scenic highways and parkways; Case studies--selected, California; Case studies--selected, Minnesota; Rest area sanitary disposal system; Infiltration and soil surfaces; Utilization of our youthful resources; Seeding the world over; Contract seeding--its good or questionable features for profit; Promoting turf growth wisely.
PB-174 826 HC$3.00 MF$0.65

COST/EFFECTIVENESS IN TRAFFIC SAFETY.
Little (Arthur D.), Inc., Cambridge, Mass.
For primary bibliographic entry see Field 13L.
PB-174 838 HC$3.00 MF$0.65

SOIL COMPACTION STUDY, VOLUME I. INTRODUCTION AND RESULTS OF INITIAL PHASES,
IIT Research Inst., Chicago, Ill.
For primary bibliographic entry see Field 8M.
PB-174 876 HC$3.00 MF$0.65

SOIL COMPACTION STUDY. VOLUME II. FIELD TEST APPARATUS AND PROCEDURES,
ITT Research Inst., Chicago, Ill.
For primary bibliographic entry see Field 8M.
PB-174 877 HC$3.00 MF$0.65

SOIL COMPACTION STUDY. VOLUME III. ANALYSIS OF FIELD TESTS OF SUBGRADE SOILS,
IIT Research Inst., Chicago, Ill.
For primary bibliographic entry see Field 8M.
PB-174 878 HC$3.00 MF$0.65

TASK AND STUDY STATEMENTS OF THE NATIONAL PROGRAM FOR RESEARCH AND DEVELOPMENT IN HIGHWAY TRANSPORTATION.
Bureau of Public Roads, Washington, D. C. Office of Research and Development.
Jan 67, 307p

Descriptors: (*Roads, *Transportation), Economics, Traffic, Urban areas, Dynamics, Control, Pavements, Design, Materials, Optimization, Environmental tests, Velocity, Stresses, Accidents, Bridges, Structures, Maintenance, Specifications, Performance (Engineering), Management planning.

Contents: Definition of underlying requirements for highway transportation; Analytic definition of complex traffic movements; Development of improved analytic techniques for designing the components of highway transportation systems; Development of methods for reliable forecasting of demand for highway transportation; Development of methods for increasing capacity, control, and safety in traffic movement; Development of techniques for more precise structural design and incorporation of new materials and structural concepts; Development of techniques for more precise structural design and incorporation of new materials and structural concepts (continued); Development and application of new technology to the location, design, construction, and maintenance processes. (Author)
PB-174 888 HC$3.00 MF$0.65

13C. CONSTRUCTION EQUIPMENT, MATERIALS, AND SUPPLIES

DETECTION AND SEMIQUANTITATIVE DETERMINATION OF PHOSPHOROUS IN PHOSPHOROUS PENTOXIDE CATALYTICALLY BLOWN ASPHALT CEMENT--LOWER COST CANAL LINING PROGRAM,
Bureau of Reclamation, Denver, Colo. Chemical Engineering Branch.
F. E. Geier. 16 May 67, 17p ChE-56

Descriptors: (*Asphalt, Chemical analysis), (*Phosphorus, Quantitative analysis), Inland waterways, Coatings, Cements, Catalysts, Phosphorus compounds, Oxides, Separation, Colorimetric analysis, Molybdenum compounds.
Identifiers: Phosphorus pentoxide.

The high resistance to field aging displayed by buried phosphorous pentoxide catalytically blown asphalt membrane canal lining indicated that a method for distinguishing this type material from other catalyst-prepared asphalt cements would be beneficial. Three laboratory methods developed for the isolation, detection, and semiquantitative determination of residual phosphorous in phosphorous pentoxide catalytically blown asphalt cement are discussed. Isolation of the phosphorous compound by ashing the sample is preferred to acid digestion because it is a faster and less tedious procedure. Two outstanding colorimetric procedures, molybdenum blue and phosphovanadomolybdate yellow, were investigated for the confirmatory test and the visual colorimetric semiquantitative test. The phosphovanadomolybdate method was chosen because it is much simpler, better adapted to field laboratories, and in the phosphorous concentrations described, the shades of yellow are as distinct as the comparable blue shades of the molybdenum blue procedure. (Author)
PB-174 844 HC$3.00 MF$0.65

13D. CONTAINERS AND PACKAGING

PROTECTIVE SHIPPING PACKAGES FOR 8- AND 12-INCH DIAMETER UF6 CYLINDERS,
Oak Ridge Gaseous Diffusion Plant, Tenn.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
K-1714 HC$3.00 MF$0.65

DESIGN AND FABRICATION OF A PHOTOTYPE LAMINATED URANIUM METAL SHIPPING CASK FOR LARGE SHIPMENTS OF CO,
Paducah Gaseous Diffusion Plant, Ky.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 13.
KY-521 HC$3.00 MF$0.65

13E. COUPLINGS, FITTINGS, FASTENERS, AND JOINTS

CHEMICAL AND CHEMICAL TECHNOLOGY, OL. 16 PART II, 1963, TRANSACTIONS: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7A.
AD-653 504 HC$3.00 MF$0.65

ADHESIVE BONDING OF STAINLESS STEELS.
Battelle Memorial Inst Columbus Ohio
For primary bibliographic entry see Field 11F.
AD-653 576 HC$3.00 MF$0.65

13F. GROUND TRANSPORTATION EQUIPMENT

SERVOMECHANISM-PROPELLED VEHICLES.
Research paper,
Institute for Defense Analyses Arlington Va
William E. Bradlay. Jun 67, 26p Rept no. RP-P-314, IDA/HQ67-5783
Contract DAHC15-67-C-0011

Descriptors: (*Vehicles, Feasibility studies), (*Hydraulic servomechanisms, Propulsion), Terrain, Machines, Control systems, Servomechanisms, Transportation, Efficiency, Maneuverability, Man-machine systems.
Identifiers: Walking machines.

The report discusses the potential utility and feasibility of novel modes of ground transportation suitable for rough terrain. More specifically, it discusses the possibility of using servomechanism propelled walking machines, describing the components of a hypothetical quadruped vehicle as a speculative example, and touching briefly on some design ideas for bipeds and hexapeds. A final section offers some discussion of the efficiency of hydraulic servomechanism propelled vehicles. (Author)
AD-653 835 HC$3.00 MF$0.65

DETERMINATION OF THE OPERATING QUALITIES OF AUTOMOBILE TYRES BY THE MODELLING METHOD.
Opredelenie Ekspluatatsionnykh Kachestv Avtomobil'nykh Shin Metodom Modelirovaniya
Royal Aircraft Establishment, Farnborough (England).
R. K. Gordon, and S. M. Tsukerberg. Nov 66, 14p RAE-LIB-TRANS-1198
Transl. Into English From Avtomob. Prom. (Moscow), No. 11, 1965 P 28-31

Descriptors: *Automobile, *Fiber strength, *Scale model, *Tire, Angle, Cord, Diameter, Differential, Envelope, Equation, Equilibrium, Fiber, Frequency, Linear, Loading, Model, Modeling, Operation, Quality, Ratio, Rubber, Scale, Strength, Stress, Torque.

For abstract, see STAR 05 15.
N67-28710 HC$3.00 MF$0.65

HEADWAY AND SWITCHING STRATEGIES FOR AUTOMATED VEHICULAR GROUND TRANSPORTATION SYSTEMS,
Massachusetts Inst. of Tech., Cambridge. Engineering Projects Lab.
Michael Bick Godfrey. 1 Nov 66, 170p
Contract C-85-65

Descriptors: (*Traffic, Control systems), (*Transportation, Automation), Deceleration, Time, Velocity, Errors, Monte Carlo method, Digital computers, Vehicles, Acceleration, Electric switches, Tables, Mathematical analysis, Distribution.

The report considers the distribution of headways throughout the vehicle flow on a one-lane guideway, the splitting of such a flow at a diverging switch, and the merging of two such flows at a converging switch. The focus of the investigation was on several vehicles near a single switch, rather than on the entire system as an integrated entity. The minimum headway separating two isolated vehicles or trains is shown to be a function of time delays in information transmission and processing, uncertainties in the measurement of, and errors in, kinematic variables, emergency stopping distance, and a cost criterion pertaining to reliability and expected damage. Several alternative headway distributions among vehicles in single-lane flow are presented, and maximum flow rates are computed as functions of these strategies and system performance parameters. The propagation of velocity transients is discussed in terms of responses to the probable inputs to a single-line of traffic. It is shown that controlling headways to a single-valued function of velocity leads to undesirable responses, and that headways must include some space in excess of the minimum safe headway. In addition to the minimum headway strategies, there is a presentation of several possible merging strategies for a converging switch and of queue disciplines to yield either maximum or minimum queue lengths. (Author)
PB-173 644 HC$3.00 MF$0.65

AIR CUSHION VEHICLE.
Port of Oakland, Calif.
For primary bibliographic entry see Field 1C.
PB-174 849 HC$3.00 MF$0.65

STUDY OF LINEAR INDUCTION MOTOR AND ITS FEASIBILITY FOR HIGH-SPEED GROUND TRANSPORTATION.
Final rept.
Garrett Corp., Los Angeles, Calif. AiResearch Mfg. Div.
Jun 67, 322p Rept. no. 67-1948
Contract C-145-66 (Neg)

Descriptors: (*Induction motors, *Linear systems), (*Transportation, Feasibility studies), Velocity, Electric motors, Thermal properties, Mechanical properties, Design, Railroads, Performance (Engineering), Railroad tracks, Operation, Temperature, Air, Ground effect, Vehicle brakes, Tables, Fluid mechanics, Suspension devices.

The report presents the results of a study program performed by AiResearch for the Office of High Speed Ground Transportation, U.S. Department of Transportation. This program is concerned with determining the feasibility and practicality of utilizing linear induction motors for high-speed ground transportation (HSGT) propulsion at speeds up to 500 mph. Detailed consideration is given to the electrical, thermal, and mechanical aspects of linear induction motor design. The electrical design analysis considers motor end effects, reaction rail design, and other motor design parameters influencing performance. The analytical models derived in the study for electrical design are verified in laboratory tests using small rotary motors designed to provide the desired data. Data on five reaction rail designs are reported. A composite reaction rail design is recommended for optimum motor performance, although other types are considered for special characteristics. The thermal studies indicate that the minimum motor size consistent with appropriate operating temperature levels for long motor life corresponds to specific continuous thrusts on the order of 1.2 to 2.4 lb per sq in. per side of motor area. The problems of air gap control, speed control, and power supply are analyzed to determine suitable provisions in the design of HSGT propulsion systems incorporating linear induction motors. Recommendations for future work include fabrication and testing of a full-scale (2500 hp) prototype linear induction motor. (Author)
PB-174 866 HC$3.00 MF$0.65

13G. HYDRAULIC AND PNEUMATIC EQUIPMENT

FLUERIC DIVERTER VALVE,
Harry Diamond Labs Washington D C
Allen B. Holmes, and Carl J. Campagnuolo. Apr 67, 33p Rept no. HDL-TR-1348

Descriptors: (*Turbojet engines, Fluid amplifiers), (*Fluid amplifiers, *Valves), Gas flow, Nozzle gas flow, Simulation, Model tests, Control systems, Fluidics.

The experimental work leading to the development of a flueric diverter valve (FDV) is described. The work has shown that a gas flow can be controlled

in a 'three-dimensional' aerodynamic valve that has no moving internal parts. In the Phase I effort, flow tests of various power nozzle configurations were completed, and a subscale model of the FDV was evaluated under simulated V/STOL operating conditions. A major objective is design of a unit of practicable size that will operate at subsonic and supersonic pressure ratios. In flow tests using cold gas at 0 to 45 psig, a subscale model of the FDV diverted 100 percent of the flow with the control orifice vented to atmosphere. The overall valving efficiency defined in terms of a thrust recovery factor for various nozzles (not optimized) typically measured 0.83. (Author)
AD-653 617 HC$3.00 MF$0.65

TEST REPORT FOR PRESSURE SWITCH SIGMA- NETICS, INC. PART NUMBERS 704011, 704012, 704013, 704024, 704025, AND 704026.
Chrysler Corp., New Orleans, La. Space Div.
8 Feb 67, 60p NASA-CR-84664, TR-RE-CCSD-FO-1029-3
Contract NAS8-4016

Descriptors: *Gas pressure, *Switch, *Test program, Access, Arm, Cycle, Explosion, Fog, Gas, Inspection, Leakage, Life, Low temperature, Pressure, Program, Salt, Saturn ib launch vehicle, Seal, Test.

For abstract, see STAR 05 15.
N67-28019 HC$3.00 MF$0.65

13H. INDUSTRIAL PROCESSES

REDUCTION OF THE CALCITE CONTENT OF GROUND SHALE BY LIQUID-LIQUID PARTICLE TRANSFER,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
For primary bibliographic entry see Field 7A.
AD-653 417 Not available from CFSTI.

STRESS-RELIEF EMBRITTLEMENT OF AX-140 AND E-11018 WELD METALS,
Navy Marine Engineering Lab Annapolis Md
Alan H. Rosenstein, and W. H. Asche. Mar 67, 29p Rept no. MEL-116/67

Descriptors: (*Welds, Stress relieving), (*Stress relieving, *Metals), (*Embrittlement, Welds), Thermal stresses, Surface properties, Transition temperature, Thickness, Stresses, Temperature, Impact tests, Time, Fracture (Mechanics), Toughness, Analysis, Tests.

An attempt was made to arrive at optimum stress-relief treatments (maximum relief of residual stress with minimum increase in transition temperature) for AX-140 and E-11018 weld metals. Stress-relief of E-11018 results in acceptable toughness (although softening must be considered), whereas, stress-relief of AX-140 can produce severe embrittlement. A satisfactory thermal stress-relief treatment cannot be specified for weldments involving AX-140. Weld metal properties vary through the thickness of the weld. Center-of-weldment material is not as tough as surface material in the as-welded condition and exhibits a greater susceptibility to stress-relief embrittlement. (Author)
AD-653 454 HC$3.00 MF$0.65

NOVELTIES IN FORGING AND STAMPING PRODUCTION: SELECTED ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
Yu. P. Sogrishin, F. G. Suvorov, N. F. Kobyakovskii, and A. V. Popov. 10 Mar 67, 42p Rept no. FTD-HT-66-375
TT-67-62094
Edited trans. of mono. Novoe v Kuznechno-Shtampovochnom Proizvodstve, n.p., 1964 p43-57, 91-9, 130-5.

Descriptors: (*Metal-forming presses, *Design), Metals, Extrusion, Machines, Dies, Machine tools, Cold working, Heat-resistant metals + alloys, USSR.

Contents: Determination of basic parameters of machines for high-speed metal forming; Study of pressworking of steels in the semi-hot state; Rubber-pad method for high-speed stamping of sheet metal.
AD-653 505 HC$3.00 MF$0.65

METHOD OF STABILIZATION OF THE FOCAL SPOT IN EQUIPMENT for ELECTION-BEAM WELDING,
Foreign Technology Div Wright-Patterson AFB Ohio
N. V. Podola, V. I. Salan, and A. B. Koval. 23 Jan 67, 7p Rept no. FTD-HT-66-708
Unedited rough draft trans. of Patent (USSR) 173 587, appl. 868015/14-7, 23 Nov 63.

Descriptors: (*Electron beam welding, *Stabilization), Focusing, Networks, Rectifiers, Voltage, Feedback, Magnetic properties, Amplifiers, USSR.

The Author Certificate introduces a method of stabilizing the focal spot in electron-beam welders with the focusing system receiving power from the network through a rectifier and a magnetic amplifier with the network-voltage and an accelerating-voltage feedback. To improve stabilization, a correcting signal proportional to the changes in accelerating voltage is fed continuously to the focusing system. (Author)
AD-653 528 HC$3.00 MF$0.65

INTRODUCTION OF PLASMA TECHNOLOGY IN THE CHEMICAL AND METALLURGICAL INDUSTRY,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-653 554 HC$3.00 MF$0.65

PLASMA PROCESSES IN METALLURGY AND PROCESSING OF MATERIALS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-653 558 HC$3.00 MF$0.65

APPLICATION OF ORTHOGONAL FILTERS FOR OPTIMIZATION AND INVESTIGATION OF STATISTICAL PROPERTIES OF ERRORS OF SELF-ADJUSTING SYSTEMS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 12A.
AD-653 560 HC$3.00 MF$0.65

A STUDY OF THE OPERATING LIMITS OF THE STANNATE IMMERSION BATH.
Final rept.,
Army Coating and Chemical Lab Aberdeen Proving Ground Md
William H. Deaver. May 67, 12p Rept no. CCL-230

Descriptors: (*Tin coatings, Electroplating), (*Electroplating solutions, Control), Magnesium, Steel, Corrosion inhibition, Coatings, Effectiveness, Salt spray tests.

A study was conducted to determine the operating limits of the stannate immersion process for minimizing galvanic corrosion of magnesium-steel couples. Salt spray tests on specimens treated and then painted indicated that 100 sq. feet of work containing up to 22 percent steel could be safely processed per gallon of bath before substandard coatings were produced. Magnesium steel couples containing more than 22 percent steel would not receive a satisfactory stannate coating. (Author)
AD-653 572 HC$3.00 MF$0.65

DEFORMATION PROCESSING OF STAINLESS STEEL.
Technical memo.,
Battelle Memorial Inst Columbus Ohio
D. E. Strohecker, A. F. Gerds, H. J. Henning, and F. W. Boulger. 21 Oct 66, 355p
NASA-TM-X-53569
Contract DA-01-021-AMC-11651 (Z)

Descriptors: (*Stainless steel, Processing), (*Manufacturing methods, *Rolling (Metallurgy)), Deformation, State-of-the-art reviews, Alloys, Extrusion, Forging, Drawing (Machine processing), Machine tools.

The report covers the state of the art of both primary and secondary fabrication methods for stainless steel. Methods currently employed for primary fabrication of these alloys include: rolling, extrusion, forging, and drawing of tube, rod, and wire. Secondary metalworking operations are those processes that produce finished or semifinished parts of sheet, bar, or tubing using additional metalforming operations. The following secondary forming processes are discussed: brake bending, deep drawing, spinning, shear forming, drop hammer, trapped rubber, stretch forming, roll forming, dimpling, joggling, and sizing. Equipment and tooling used for the various operations are discussed and illustrated wherever possible.
AD-653 577 HC$3.00 MF$0.65

RARE EARTH RESEARCH CONFERENCE (6th), May 3-5, 1967, GATLINBURG, TENNESSEE.
Oak Ridge National Lab Tenn
May 67, 757p
AFOSR-67-1214
Grants AF-AFOSR-67-0001, AF-AFOSR-67-0226
See also AD-627 224.

Descriptors: (*Rare earths, Symposia), (*Inorganic compounds, *Industrial research), Chemistry, Solid state physics, Metallurgy, Rare earth compounds, Oxides, Scientific personnel, Tennessee.

This report contains preprints of papers presented at the technical sessions of the Sixth Rare Earth Research Conference held at Gatlinburg, Tennessee, May 3-5, 1967. The sessions were divided into chemistry, solid state, metallurgy, and industrial processes.
AD-653 605 HC$3.00 MF$0.65

FIFTH PROGRESS REPORT BY THE AD HOC COMMITTEE ON METALWORKING PROCESSES AND EQUIPMENT.
Progress rept.
Materials Advisory Board (Nas-Nrc) Washington D C
Apr 67, 23p Rept no. MAB-206-M
Contract DA-49-083-OSA-3131
See also AD-640 230.

Descriptors: (*Material forming, Metals), State-of-the-art reviews, Ductility, Failure (Mechanics), Strain (Mechanics).

The report reviews the state of knowledge of the following topics: mechanisms of ductile fracture, formability limits, and mechanical property changes by plastic strain cycling.
AD-653 656 HC$3.00 MF$0.65

CRACK PROPAGATION STUDIES OF WELDS IN TANTALUM AND COLUMBIUM SHEET.
Final rept.,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab

K. E. Hays. Mar 67, 31p Rept no. LMSC-B-70-67-18

Descriptors: (*Welds, *Crack propagation), Tantalum, Niobium, Sheets, Inert gas welding, Impact tests, Microstructure, Fracture (Mechanics), Toughness.

Single pass welds were prepared in 0.015-in.-thick tantalum (Ta) and columbium (Cb) sheet material by the automatic-inert-gas, nonconsummable electrode (TIG) process, representing 'best practice.' Edges of the material were formed to provide filler material. Tensile and precracked sheet Charpy tests were performed. Crack propagation resistance measurements were obtained for weld centerline, heat affected zone and base metal locations. Modes of failure were obtained and categorized. Both macroscopic and microscopic examinations were made of the weld zone, heat affected zone, and base metal. (Author)
AD-654 150 HC$3.00 MF$0.65

STRESS-CORROSION CRACKING RESISTANCE OF AN 18Ni 200 GRADE MARAGING STEEL BASE PLATE AND WELD.
Naval Research Lab Washington D C
For primary bibliographic entry see Field 11F.
AD-654 161 HC$3.00 MF$0.65

PROTECTION OF MOORING BUOYS. PART IX. RESULTS OF EIGHTH RATING INSPECTION.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 13J.
AD-654 173 HC$3.00 MF$0.65

TABLES OF JOINT PROBABILITIES USEFUL IN EVALUATING MIXED ACCEPTANCE SAMPLING PLANS.
Rutgers - the State Univ New Brunswick N J Statistics Center
For primary bibliographic entry see Field 12A.
AD-654 178 HC$3.00 MF$0.65

SUPPLEMENT TO TABLES OF JOINT PROBABILITIES.
Rutgers - the State Univ New Brunswick N J Statistics Center
For primary bibliographic entry see Field 12A.
AD-654 179 HC$3.00 MF$0.65

ROLLING STUDIES OF URANIUM RODS AND TUBES,
National Lead Co., Cincinnati, Ohio.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 21 13.
NLCO-990 HC$3.00 MF$0.65

ADHESIVE BONDING OF STAINLESS STEELS.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
R. E. Keith, D. C. Martin, and M. D. Randall. 16 Feb 67, 64p NASA-TM-X-53574
Contract DA-01-021-AMC-11651/Z/
Prepared By Battelle Memorial Inst.

Descriptors: *Adhesive, *Metal bonding, *Stainless steel, Bonding, Design, Environment, Factor, Inorganic, Joining, Metal, Method, Organic, Processing, Stainless, Steel.

For abstract, see STAR 05 15.
N67-28756 HC$3.00 MF$0.65

INFLUENCE OF THE PREPARATION CONDITIONS ON THE CAPACITANCE OF THE DOPED SINTERED TI O2 COMPACTS.
Nuklearni Institut Jozef Stefan, Ljubljana (Yugoslavia).
M. Buh, D. Kolar, and J. Puh. Dec 66, 6p NIJS-R-492
Presented At the Elec. and Magnetic Ceram., London, 6-7 Dec. 1966

Descriptors: *Capacitance, *Titanium oxide, Antimony, Capacitor, Ceramic, Dependence, Dissipation, Doping, Oxide, Resistance, Sintering, Temperature, Titanium.

For abstract, see STAR 05 15.
N67-28869 HC$3.00 MF$0.65

13I. MACHINERY AND TOOLS

CHEMICAL AND CHEMICAL TECHNOLOGY, VOL. 16 PART II, 1963, TRANSACTIONS: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7A.
AD-653 504 HC$3.00 MF$0.65

NOVELTIES IN FORGING AND STAMPING PRODUCTION: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13H.
AD-653 505 HC$3.00 MF$0.65

A REVIEW OF THE STATE OF THE ART OF CYCLONE-TYPE SEPARATORS.
Ohio State Univ Research Foundation Columbus
For primary bibliographic entry see Field 21E.
AD-653 578 HC$3.00 MF$0.65

FIFTH PROGRESS REPORT BY THE AD HOC COMMITTEE ON METALWORKING PROCESSES AND EQUIPMENT.
Materials Advisory Board (Nas-Nrc) Washington D C
For primary bibliographic entry see Field 13H.
AD-653 656 HC$3.00 MF$0.65

CONTRAROTATING THRUST BEARING MODIFICATIONS.
Navy Marine Engineering Lab Annapolis Md
For primary bibliographic entry see Field 13J.
AD-654 176 HC$3.00 MF$0.65

BEARING MATERIALS FOR WATER LUBRICATION.
Navy Marine Engineering Lab Annapolis Md
For primary bibliographic entry see Field 11H.
AD-654 177 HC$3.00 MF$0.65

STRESS ANALYSES OF RADIAL FLOW IMPELLER WHEELS.
Festigkeitsuntersuchungen An Radial Durchstroemten Laufraedern Technische Hochschule Aachen (West Germany). Institut Fuer Strahlantriebe Und Turboarbeitsmaschinen.
W. Soetebeer. 1966, 13p
in German. English Summary Presented At the Ann. Joint Meeting grr/Wglr, Bad Godesberg, W. Germany, Oct. 1966 Its Meeting Paper No. 66-119

Descriptors: *Impeller, *Radial flow, *Strain gauge, *Stress analysis, Analysis, Centrifugal, Compressor, Conference, Distribution, Flow, Gauge, Radial, Strain, Stress, Turbine, Wheel.

For abstract, see STAR 05 15.
N67-28804 HC$3.00 MF$0.65

13J. MARINE ENGINEERING

PORTABLE DEPTH ECHO SOUNDING TESTS-MODIFIED RAYTHEON DE-723B FATHOMETER WITH A NARROW BEAM TRANSDUCER.
Informal rept.,
Naval Oceanographic Office Washington D C
George Tselepis. May 67, 33p Rept no. NOO-IR-67-40

Descriptors: (*Depth finding, *Depth indicators), (*Navigational aids, Naval research), Potomac River, Transducers, Narrowband, Sound transmission, Ship hulls, Marine engineering, Landing craft, Portable, Vibration, Feasibility studies.

A series of tests of a portable Raytheon DE-723B fathometer were made in the Anacostia and Potomac Rivers to evaluate over-the-side and through-the-hull transmission at various speeds. The over-the-side transducer mount provided high resolution at speeds up to 10 knots. Transmission through the steel hull of an LCM-6 (Landing Craft Medium) is feasible at speeds up to 3 knots using maximum sensitivity settings. Location of the transducer over-the-side near the pilot house and rigged to minimize vibration is recommended for surveys using LCM-6 craft.
AD-653 445 HC$3.00 MF$0.65

DEGAUSSING COIL INTERFERENCE.
Navy Marine Engineering Lab Annapolis Md
For primary bibliographic entry see Field 20C.
AD-653 450 HC$3.00 MF$0.65

LABORATORY STUDY OF SEICHING INDUCED ON AN OFFSHORE SHELF.
Technical note,
Naval Civil Engineering Lab Port Hueneme Calif
L. E. Robson, and D. B. Jones. Feb 67, 53p Rept no. NCEL-TN-895

Descriptors: (*Water waves, *Laboratories), (*Water tanks, *Oscillation), Low frequency, Surface properties, Gravity, Underwater explosions, Nuclear explosions, Beaches, Water, Structures, Tests.

An exploratory investigation was made in the NCEL wave tank to determine whether with existing equipment an oscillation (seiche) of the water over a submerged shelf just offshore could be induced by an incident train of shorter waves and if so, whether the run-up from the wave system on the beach would thereby be affected significantly. This study was a phase of current work at NCEL dealing with the run-up and other shore effects of surface gravity waves from underwater explosions and was supported by the Defense Atomic Support Agency under its subtask 14.083, Effects of Underwater Nuclear Explosions on Waterfront Structures. When the wave-maker was set to generate short waves, a low-amplitude dispersive train preceded the regular (periodic) train. Weak low-frequency oscillations in the run-up record occurring prior to the arrival of the periodic train were detected in seven of eighteen runs analyzed, the frequencies agreeing with estimates of first-mode shelf-seiche frequencies. A special run-up factor was evaluated for four of these seven runs; it indicated maximum run-up in the long-period wave spectrum alone of from 35% to 85% of the maximum run-up in the spectrum of the incident dispersive waves. The highest value was associated with the highest incident train. From these results it was concluded that a seiche existed in some of the runs. It is believed that the principal reason why no oscillation was detected in other runs is that the heights of the incident dispersive waves (which could not be increased) were too small. When the wave-maker was set to generate long waves, the initial waves at the shelf were those of the periodic train. (Author)
AD-653 711 HC$3.00 MF$0.65

CONCEPT FOR A MANNED UNDERWATER STATION.

Southwest Research Inst San Antonio Tex
For primary bibliographic entry see Field 14B.
AD-653 730 HC$3.00 MF$0.65

PHOTOELASTIC INVESTIGATION OF STRESSES AT WINDOWS AND HATCHES IN SPHERICAL PRESSURE VESSELS,
Allied Research Associates Inc Concord Mass
Harold Hamilton, and Herbert Becker. 5 Dec 63, 25p Rept no. ARA-F-9250-3
Contract NObs-88648

Descriptors: (*Pressure vessels, Stresses), (*Underwater vehicles, Stresses), Spheres, Photoelasticity, Hatches, Loading (Mechanics), Mechanical properties.
Identifiers: Windows.

Through three-dimensional photoelasticity, stresses were determined in externally pressurized spheres with simulated hatches and windows representative of bathyscaph pressure vessel construction. Stresses were determined for various seat chamfer angles and material combinations. In addition, an exploratory study was made of the effect of friction upon the stresses in windows. A major result of the study is the indication that for hatch chamfer angles of 15 degrees or less no local reinforcement is required either in the sphere or in the hatch. No conclusions were reached concerning sphere design near a window since additional data on effects of friction are required before this problem can be resolved. (Author)
AD-653 749 HC$3.00 MF$0.65

APPLICATION OF LIFTING-SURFACE THEORY TO THE PREDICTION OF HYDROELASTIC RESPONSE OF HYDROFOIL BOATS.
Final rept.,
Stevens Inst of Tech Hoboken N J Davidson Lab
Charles J. Henry. May 67, 56p Rept no. 1202
Contract Nobs-92423

Descriptors: (*Hydrofoil boats, Hydrodynamics), Lift, Elasticity, Flutter, Theory, Predictions, Stability, Downwash, Hydrofoils, Equations of motion, Integral equations.
Identifiers: Hydroelasticity.

A theoretical procedure is developed for the prediction of the dynamic response, elastic or rigid body, of a hydrofoil-supported vehicle in the flying condition -- to any prescribed transient or periodic disturbance. The procedure also yields the stability indices of the response, so that dynamic instabilities such as flutter can also be predicted. The unsteady hydrodynamic forces are introduced in the equations of motion for the elastic vehicle in terms of the indicial-pressure-response functions, which are derived from lifting-surface theory. Thus, the predicted vehicle-response includes the effects of three-dimensional unsteady flow conditions at specified forward speed. The natural frequencies and elastic modes of vibration of the vehicle and foil system in the absence of hydrodynamic effects are presumed known. A numerical procedure is presented for the solution of the downwash integral equations relating the unknown indicial pressure distributions to the specified elastic-mode shapes. The procedure is based on use of the generalized-lift-operator technique together with the collocation method. (Author)
AD-653 751 HC$3.00 MF$0.65

STANDARD EQUATIONS OF MOTION FOR SUBMARINE SIMULATION.
Research and development rept.,
Naval Ship Research and Development Center Washington D C
Morton Gertler, and Grant R. Hagen. Jun 67, 46p Rept no. NSRDC-2510

Descriptors: (*Submarines, Simulation), Equations of motion, Design, Trajectories, Fluid dynamic properties, Maneuverability.

Standard equations of motion are presented for use in submarine simulation studies being conducted for the U. S. Navy. The equations are general enough to simulate the trajectories and responses of submarines in six degrees of freedom resulting from various types of normal maneuvers as well as for extreme maneuvers such as those associated with emergency recoveries from sternplane jam and flooding casualties. Information is also presented pertaining to the hydrodynamic coefficients and other input data needed to perform simulation studies of specific submarine designs with the standard equations of motion. (Author)
AD-653 861 HC$3.00 MF$0.65

A PROPOSED NEW STERN ARRANGEMENT.
Naval Ship Research and Development Center Washington D C Hydromechanics Lab
Pao C. Pien, and Jorgen Strom-Tejsen. May 67, 31p
NSRDC-2410

Descriptors: (*Ships, Design), Propellers (Marine), Ship hulls, Cavitation, Vibration, Model tests, Propulsion.

The trend of ship designs toward high speed and power has led to increasing propulsive difficulties due to the problems of cavitation and propeller-induced vibration. Consequently, in the design of stern arrangement, considerations must be focused on these problems in addition to propulsive efficiency. The report deals with the factors that influence the hull-propeller interaction problem. It discusses the advantages and disadvantages of single-screw and twin-screw stern arrangements presently used. A new twin-screw arrangement is described. In this stern arrangement the two propellers are mounted close to the ship centerline with overlapping propeller fields. The propulsive efficiency, cavitation, and vibration qualities of the new arrangement are discussed. Preliminary model tests with the new stern arrangement are presented and considerations to be taken in the design are mentioned. (Author)
AD-653 862 HC$3.00 MF$0.65

OCEANOGRAPHIC SHIP OPERATING SCHEDULES FOR FISCAL YEAR 1968.
Interagency Committee on Oceanography Washington D C
May 67, 38p Rept no. ICO-Pamphlet-28
See also AD-645 543.

Descriptors: (*Oceanographic vessels, Scheduling), (*Oceanology, Scientific organizations), Ships (Nonmilitary), Operation, Tables, Oceanographic equipment.

The Interagency Committee on Oceanography publishes semi-annually for the National Council on Marine Resources and Engineering Development the planned schedules, type of work, and general areas of operation for all government-owned or sponsored oceanographic ships of the United States. The first edition of the Oceanographic Ship Operating Schedules (ICO Pamphlet No. 1) was published in March 1961. This document usees the same general format as previous issues and includes the most recent additions to our oceanographic fleet.
AD-653 863 HC$3.00 MF$0.65

RESPONSE OF SLOWLY MOVING SHIP TO PROPELLER AND RUDDER ACTIONS,
Stevens Inst of Tech Hoboken N J Davidson Lab
C. Lincoln Crane, Jr. Oct 66, 67p Rept no. 1169
Contract Nonr-263 (63)

Descriptors: (*Ships, Maneuverability), Propellers (Marine), Marine rudders, Control, Equations of motion, Model tests, Fluid dynamic properties, Propulsion, Performance (Engineering).

An attempt is made to extend ship maneuvering analysis for application at low ship speeds. Experiments are made with captive-model to investigate effects of non-equilibrium propeller speeds on rudder force and effective thrust. Other experiments are made to explore first-order effects of very large drift angles and pure yaw rotation on hull hydrodynamic reactions. The experimental results, together with previous rotating-arm data, are applied in motion equations, accounting for both extreme propeller actions and the occurrence of large drift angles and turning rates. Also included are propulsion and rudder time lags, and the influence of uniform water-current on ship trajectory. The equations are programmed for computation, and ship response to a simple docking maneuver is predicted. The computation is repeated several times to examine sensitivity of ship motions and trajectory to variations of operating parameters; namely, maximum reverse propeller-speed, engine response time, and water-current direction. (Author)
AD-653 882 HC$3.00 MF$0.65

AN EXPERIMENTAL STUDY OF THE HYDROELASTIC INSTABILITY OF SUPERCAVITATING HYDROFOILS.
Technical rept., 1 Oct 64-30 Sep 66,
Minnesota Univ Minneapolis St Anthony Falls Hydraulic Lab
C. S. Song, and John Almo. Feb 67, 55p Rept no. 89
Contract Nonr-710 (66)

Descriptors: (*Hydrofoils, *Flutter), Stability, Elasticity, Fluid dynamic properties, Cavitation, Velocity, Damping, Wedges, Leading edge, Friction.
Identifiers: Supercavitating hydrofoils.

Some experimental findings concerning the flutter characteristics of two-dimensional supercavitating flat-plate hydrofoils are reported. The experiment was carried out in a free-jet water tunnel using wedge-shaped hydrofoils (practically rigid) elastically supported to permit two degree of freedom motions in translational and rotational modes. Critical flutter speed, flutter frequency, flutter amplitude ratio, and damping factor were measured for various elastic and flow conditions. The measured stability boundary curves agree, qualitatively, with an existing linear theory. The effect of leading-edge condition, free surface, ventilation, cavity length, and friction were also explored. The magnitude and the complexity of the leading-edge effect on the critical flutter speed is particularly noteworthy. A cavity pinch-off phenomenon was revealed. Also revealed are the occurrence of a rolling mode of flutter and cavity pulsation which may coexist with the two degree of freedom flutter under certain circumstances. (Author)
AD-654 145 HC$3.00 MF$0.65

UNIVERSITY SEALAB: DESIGN AND ANALYSIS OF A SATURATION DIVING FACILITY FOR THE NATIONAL OCEANOGRAPHIC COMMUNITY.
Technical rept.
New Hampshire Univ Durham Engineering Design and Analysis Lab
Jan 67, 298p Rept no. TR-100
Contract Nonr-3710 (04)

Descriptors: (*Laboratories, Underwater), Oceanology, Design, Life support, Hulls (Marine), Systems engineering, Oceanographic equipment, Scientific personnel, Tenders (Vessels), Costs.

Two detailed conceptual designs of saturation-diving systems are presented that meet the most immediate requirements of potential scientific-diver users who need saturation-diving techniques to accomplish their individual research objectives. The objective of this design program is to present a design that is within the state of the engineering art either as successfully demonstrated in previous

a design that is within the state of the engineering art either as successfully demonstrated in previous saturation-diving habitat experiments or in other fields of engineering effort where the experience is applicable. The OSCILAB system takes the approach of placing almost the entire saturation-diving system on the bottom. This ship-shape submersible laboratory relies upon a ballasting system to raise and lower itself rather than depending upon a surface crane. The laboratory is towed to any particular site by a reasonably small vessel which can be leased and calls for a minimum of specialized surface support facilities. The SEADOPOD system has its beginnings in the already operational elevator-chamber systems that have been developed by commercial organizations in the United States. However, because of the requirements of the diver-scientists, the elevator-pod which carries the divers from the pressurized deck living facility to the bottom is considerably larger and undoubtedly more comfortable than commercial models.
AD-654 159 HC$3.00 MF$0.65

IMPACT STRENGTH AND RESPONSE OF PROTECTED BRITTLE MODELS OF DEEP SUBMERGENCE STRUCTURES.
Naval Ship Research and Development Center Washington D C Structural Mechanics Lab
For primary bibliographic entry see Field 20K.
AD-654 165 HC$3.00 MF$0.65

PROGRESS REPORT OF THE VIBRATION TASK GROUP OF THE S.N.A.M.E.,
Naval Ship Research and Development Center Washington D C Acoustics and Vibration Lab
E. F. Noonan. Jun 67, 38p
NSRDC-2415

Descriptors: (*Ship hulls, Vibration), Merchant vessels, Tolerances (Physiology), Human engineering, Measurement.

The commercial ship program of HS 2-1 Task Group (Vibrations) of the Society of Naval Architects and Marine Engineers and the 'Code for Shipboard Hull Vibration Measurements' and the problems associated with the development of 'Norms' of Hull Vibration are discussed. A review of the work accomplished since the 1964 meeting of the I.S.S.C. is given and future plans discussed. (Author)
AD-654 166 HC$3.00 MF$0.65

PROTECTION OF MOORING BUOYS. PART IX. RESULTS OF EIGHTH RATING INSPECTION.
Technical rept. for Feb-Sep 66,
Naval Civil Engineering Lab Port Hueneme Calif
R. W. Drisko. Jun 67, 45p Rept no. NCEL-TR-531
See also AD-636 422.

Descriptors: (*Mooring buoys, *Protective treatments), (*Corrosion inhibition, Mooring buoys), Environmental tests, San Diego Bay, Cathodic protection, Coatings, Plastic coatings, Antifouling coatings, Degradation, Fouling.

This is the ninth of a series of reports on the protection of mooring buoys. Thirteen buoys were given their eighth rating (after a maximum of 4-1/2 years exposure) for extent of coating deterioration, corrosion of steel, and fouling. Two other buoys had previously been removed from testing in San Diego Bay because of advanced deterioration. The coating systems on three of the buoys were in good condition, while those on 10 others showed varying degrees of moderate deterioration. Two sets of 13 steel panels each, coated with the different systems used on the buoys, were given their seventh rating inspection after 3-1/2 years of exposure. One set was exposed in San Diego Bay and the other in Port Hueneme Harbor. The condition of the coatings on both sets of panels was generally better than that of the buoy coatings, but there was a general correlation between the conditions of the two test groups. On buoys coated with antifouling paints, no detectable antifouling property remained after 20 months, but on both sets of test panels, two antifouling coatings containing copper oxide were still appreciably reducing fouling after 3-1/2 years. Patches of underwater-curing epoxy applied to buoys where localized damage to the coating had been caused by abrasion were in good condition. Some patches had been in place for 3-1/2 years. Three of the buoys were cathodically protected with zinc anodes. The underwater portions of these buoys were receiving protection from corrosion 28 months after anode installation. (Author)
AD-654 173 HC$3.00 MF$0.65

CONTRAROTATING THRUST BEARING MODIFICATIONS
Research and development rept.,
Navy Marine Engineering Lab Annapolis Md
Alfred B. Harbage. Mar 67, 26p Rept no. MEL-147/67

Descriptors: (*Thrust bearings, Lubrication), (*Steam turbines, Thrust bearings), Marine propulsion, Oils, Flow visualization, Models (Simulations), Rotation, Cavitation.

A model of the No. 2 thrust bearing of the MST-12 turbine was constructed to permit visual observation of the flow of oil through its various elements in an effort to determine and alleviate the cause of two failures. From operation of the model, it was determined that off-gasing of dissolved air from the lubricating oil took place over a large portion of the turbine's speed range. Under these conditions it was seen that the flow of oil was such that a lubricating film could not be maintained between contrarotating shoes and thrust runner. It bypassed this location almost altogether. Installation of several modifications were made. These modifications first directed the lubricating oil to the proper location, then held it there until it was spent. Visual observations of the model with the modifications installed were sufficiently convincing to the observers to direct the incorporation of the modifications in the MST-12 turbine. Subsequent sea trials have been satisfactory. (Author)
AD-654 176 HC$3.00 MF$0.65

BEARING MATERIALS FOR WATER LUBRICATION.
Navy Marine Engineering Lab Annapolis Md
For primary bibliographic entry see Field 11H.
AD-654 177 HC$3.00 MF$0.65

13K. PUMPS, FILTERS, PIPES, FITTINGS, TUBING, AND VALVES

LABORATORY INVESTIGATION OF SOIL INFILTRATION THROUGH PIPE JOINTS.
Army Engineer Waterways Experiment Station Vicksburg Miss
For primary bibliographic entry see Field 8M.
AD-653 599 MF$0.65

SATURN IB PROGRAM. TEST REPORT FOR FLEXIBLE HOSE, 1/4-INCH, 3000-PSIG AEROQUIP CORPORATION PART NUMBER 675003-4-0420, NASA DRAWING NUMBER 75 M11337-4-0420.
Chrysler Corp., New Orleans, La. Space Div.
R. Kolowith. 20 Dec 66, 39p NASA-CR-84842, TR-RE-CCSD-FO-1005-3
Contract NAS8-4016

Descriptors: *Ground support equipment, *Quality control, *Test program, Burst, Control, Equipment, Facility, Flexibility, Ground, Helium, Hose, Inspection, Installation, Leakage, Performance, Pressure, Program, Quality, Saturn launch vehicle, Support, Test.

For abstract, see STAR 05 15.
N67-28826 HC$3.00 MF$0.65

13L. SAFETY ENGINEERING

THE 1965 MONTREAL, CANADA, APARTMENT HOUSE EXPLOSION: SOME NOTES AND COMPARISONS WITH THE INDIANAPOLIS, INDIANA, COLISEUM EXPLOSION.
Ohio State Univ Columbus Disaster Research Center
For primary bibliographic entry see Field 19D.
AD-653 889 HC$3.00 MF$0.65

FIBERCELL OVERHEAT HAZARD DETECTION SYSTEM.
Whittaker Corp San Diego Calif Narmco Research and Development Div
For primary bibliographic entry see Field 1D.
AD-653 996 HC$3.00 MF$0.65

THE PROTECTION OF A AND A. E. E. WIRE AND OPTICAL TRACE ACCIDENT RECORDERS.
Aeroplane and Armament Experimental Establishment, Boscombe Down (England).
For primary bibliographic entry see Field 1B.
For abstract, see STAR 05 15.
N67-27791 HC$3.00 MF$0.65

THE HIGH FLUX ISOTOPE REACTOR ACCIDENT ANALYSIS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
ORNL-3573 HC$3.00 MF$0.65

COST/EFFECTIVENESS IN TRAFFIC SAFETY.
Final rept.
Little (Arthur D.), Inc., Cambridge, Mass.
May 67, 195p
Contract C-201-66

Descriptors: (*Traffic, Safety), Cost effectiveness, Transportation, Motor vehicle accidents, Feasibility studies, Passenger vehicles, Research program administration, Statistical analysis, Optimization, Motor vehicle operators, Training, Roads, Law.

The report reviews the principles and the methods of cost/effectiveness analysis, and also examines the specific requirements for applying such analysis in the field of traffic safety. It is concluded that the formal analytical methodology is adequate, but its application is seriously limited by deficiencies in the substantive information available regarding the effects of traffic safety programs. Four specific categories are described: gross statistics, cause and effect relationships, program costs, and program effectiveness. The report examines the background for the study project, the principal findings, and the three major topics: analysis, data, and measurements. An annex contains a survey of optimization techniques, a pilot study evaluating remedies for cross-median collisions, a review of the adequacy of traffic safety data in various program categories, and a set of examples dealing with measurement problems.
PB-174 838 HC$3.00 MF$0.65

LIST OF PUBLICATIONS ON FIRE PERFORMANCE.
Forest Products Labs., Madison, Wis.
For primary bibliographic entry see Field 11L.
PB-174 845 HC$3.00 MF$0.65

TASK AND STUDY STATEMENTS OF THE NATIONAL PROGRAM FOR RESEARCH AND DEVELOPMENT IN HIGHWAY TRANSPORTATION.
Bureau of Public Roads, Washington, D. C. Office of Research and Development.
For primary bibliographic entry see Field 13B.
PB-174 888 HC$3.00 MF$0.65

13M. STRUCTURAL ENGINEERING

A CRITICAL EVALUATION OF THE MARKOV MATRIX TREATMENT OF NEUTRON DIFFUSION IN SLABS.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 18F.
AD-653 444 HC$3.00 MF$0.65

SHEAR MODULUS DETERMINATION IN LAMINATED COMPOSITE MATERIALS.
Air Force Materials Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11D.
AD-653 590 HC$3.00 MF$0.65

COST TRENDS OF MASS PRODUCTION AS APPLIED TO 5-10 PSI SHELTERS.
Final rept.,
Stanford Research Inst Menlo Park Calif
Charles Curione. Feb 67, 92p
Contract OCD-PS-64-201

Descriptors: (*Shelters, Costs), Industrial production, Prefabricated buildings, Construction, Concrete, Weight.

The primary objective of the study was to determine the cost reduction potential of mass production techniques applied to 5-10 PSI shelter construction programs. Various industries employing mass production methods in the manufacture of structures or structural components were invited to provide comments pertinent to this research. Reports and studies covering shelter costs were reviewed, and applicable cost data were integrated into the report. The findings of this research indicate that some cost reduction can be achieved by use of mass production techniques where such techniques are applied to shelter construction. However, mass production does not always achieve the magnitude of cost reduction that one might expect from this technique. (Author)
AD-653 669 HC$3.00 MF$0.65

SYNOPSIS OF A THEORY FOR SHOCK IMPEDANCE EFFECTS IN A ROUGH-WALLED TUNNEL.
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
For primary bibliographic entry see Field 20D.
AD-653 860 HC$3.00 MF$0.65

FORCED VIBRATIONS OF SUBMERGED SPHEROIDAL SHELLS,
Columbia Univ New York Dept of Civil Engineering and Engineering Mechanics
For primary bibliographic entry see Field 20K.
AD-653 870 Not available from CFSTI.

SHELTER OCCUPANCY STUDIES-UNIVERSITY OF GEORGIA (1966). VOLUME II. COMMUNITY FALLOUT SHELTER HANDBOOK FOR UNTRAINED MANAGEMENT.
Georgia Univ Athens Civil Defense Research
For primary bibliographic entry see Field 15C.
AD-653 879 HC$3.00 MF$0.65

SHELTER OCCUPANCY STUDIES AT THE UNIVERSITY OF GEORGIA (1966), VOLUME I.
Georgia Univ Athens Civil Defense Research
For primary bibliographic entry see Field 15C.
AD-653 881 HC$3.00 MF$0.65

A GENERAL THEORY OF OPTIMAL PLASTIC DESIGN,
California Univ San Diego La Jolla
William Prager, and R. T. Shield. 7 Mar 66, 6p
AROD-5133:30
Contract DA-31-124-ARO (D)-257, ARPA Order-0570
Availability: Published in Journal of Applied Mechanics p184-6 Mar 1967.

Descriptors: (*Structures, Plasticity), Design, Theory, Optimization, Beams (Structural), Costs.

Optimal plastic design for minimum weight has been discussed extensively in recent years. The large majority of the investigations assume the unit structural weight to be proportional to the plastic resistance. For example, the weight per unit length of a beam is assumed to be proportional to the full plastic moment. The resulting optimal designs are often unrealistic because they have sections of vanishing plastic resistance. A more general method of optimal plastic design has recently been developed by Marcal and Prager, who assume that the unit cost is a convex function of the plastic resistance. This method enables the designer to choose a minimum plastic resistance and to consider only the cost caused by exceeding this resistance. As a consequence, unrealistic designs with sections of zero strength are avoided. The present paper briefly reviews the method of Marcal and Prager, extends it to arbitrary one and two-dimensional structures, and discusses the uniqueness of optimal designs. (Author)
AD-653 892 Not available from CFSTI.

THE THERMODYNAMIC PROPERTIES OF DEUTERIUM.
National Bureau of Standards, Boulder, Colo. Cryogenics Div.
For primary bibliographic entry see Field 7C.
For abstract, see STAR 05 15.
N67-28936 HC$3.00 MF$0.65

14. METHODS AND EQUIPMENT

14A. COST EFFECTIVENESS

MANAGERS GUIDE TO STANDARD TECHNIQUE FOR REPORTING INFORMATION ON VALUE ENGINEERING,
Ammunition Procurement and Supply Agency, Joliet, Ill. Operations Research Div.
For primary bibliographic entry see Field 5A.
AD-447 561 HC$3.00

A METHOD FOR SELECTING CONTRACT COST INCENTIVES,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5C.
AD-653 508 HC$3.00 MF$0.65

A NUMERICAL TAXONOMY METHOD TO EVALUATE AND PREDICT EQUIPMENT PERFORMANCE FROM ENVIRONMENTAL ENGINEERING DATA,
Frankford Arsenal Philadelphia Pa
For primary bibliographic entry see Field 5A.
AD-653 621 HC$3.00 MF$0.65

A RECIPE FOR THE DEVELOPMENT OF COMPLEX SYSTEMS.
Naval Air Development Center Johnsville Pa Aeronautical Electronic and Electrical Lab
For primary bibliographic entry see Field 5A.
AD-653 710 HC$3.00 MF$0.65

COST/EFFECTIVENESS IN TRAFFIC SAFETY.
Little (Arthur D.), Inc., Cambridge, Mass.
For primary bibliographic entry see Field 13L.
PB-174 838 HC$3.00 MF$0.65

14B. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

SPARK-SOURCE MASS SPECTROSCOPY,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 7D.
AD-653 414 Not available from CFSTI.

APPLICATION OF NANOSECOND LIGHT PULSES TO BALLASTIC RANGE MEASUREMENTS,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 19D.
AD-653 498 Not available from CFSTI.

COMPONENT EVALUATION DURING SHOCK,
Harry Diamond Labs Washington D C
A. J. Buschman, Jr. May 67, 37p Rept no. HDL-TM-67-7

Descriptors: (*Impact shock, Test methods), Wire, Electronic equipment, Resistors, Capacitors, Projectiles, Terminal ballistics, Guns, Accelerometers.
Identifiers: Evaluation.

A test method was developed that allows direct wire monitoring of an item during application of shock. The method employs the air gun facilities of HDL. The test item is mounted in a target body that is impacted by the air gun projectile. Peak accelerations of 20,000 g with a duration of 0.75 msec were obtained. The components evaluated, primarily resistors and capacitors, showed very small dynamic changes. (Author)
AD-653 533 HC$3.00 MF$0.65

NONDESTRUCTIVE EVALUATION OF METAL FATIGUE.
Southwest Research Inst San Antonio Tex Dept of Instrumentation Research
For primary bibliographic entry see Field 20K.
AD-653 587 HC$3.00 MF$0.65

INTERFEROMETRIC MEASUREMENT OF DISPLACEMENTS DURING WAVE PROPAGATION IN SOLIDS,
Ballistic Research Labs Aberdeen Proving Ground Md
For primary bibliographic entry see Field 20K.
AD-653 635 HC$3.00 MF$0.65

A STUDY TO IMPROVE THE LOW-LEVEL METEOROLOGICAL SIMULATOR.
Texas A and M Univ College Station
For primary bibliographic entry see Field 4B.
AD-653 644 HC$3.00 MF$0.65

NOISE MEASUREMENTS AS A TOOL IN ELECTRON DEVICE RESEARCH.
Minnesota Univ Minneapolis Electron Tube Research Lab
For primary bibliographic entry see Field 9A.
AD-653 653 HC$3.00 MF$0.65

THE EVALUATION OF RHENIUM RESISTORS.
Naval Air Development Center Johnsville Pa

Aeronautical Photographic Experimental Lab
For primary bibliographic entry see Field 9A.
AD-653 715 HC$3.00 MF$0.65

AN EXPERIMENTAL ASSESSMENT OF A GROUND PILOT TRAINER IN GENERAL AVIATION.
Miami-Dade Junior Coll Fla
For primary bibliographic entry see Field 5I.
AD-653 729 HC$3.00 MF$0.65

CONCEPT FOR A MANNED UNDERWATER STATION.
Final rept., 25 Mar 66-2 Feb 67,
Southwest Research Inst San Antonio Tex
R. C. DeHart, O. O. Benson, Jr., and N. I. Turner.
Feb 67, 187p
NCEL-CR-67.022
Contract NBy-62203

Descriptors: (*Underwater, *Laboratories), Underwater equipment, Life support, Manned, Ocean bottom, Deep submergence, Closed ecological systems, Buoyancy, Communication equipment, Stability, Power equipment, Television equipment, Anchors (Marine), Operation, Storage, Equations of motion, Surface-to-underwater, Tables, Stresses, Design.

A concept for a Manned Underwater Station capable of descending to a depth of 6,000 feet is described. The Station is attached to an anchor resting on the bottom of the ocean and is winched to the desired depth. Living and working space for a five-man crew is provided in the Station. (Author)
AD-653 730 HC$3.00 MF$0.65

AN EXPERIMENTAL ASSESSMENT OF A GROUND PILOT TRAINER IN GENERAL AVIATION.
Middle Tennessee State Univ Murfreesboro
For primary bibliographic entry see Field 5I.
AD-653 733 HC$3.00 MF$0.65

AN EXPERIMENTAL ASSESSMENT OF A GROUND PILOT TRAINER IN GENERAL AVIATION.
Ohio State Univ Columbus Dept of Aviation
For primary bibliographic entry see Field 5I.
AD-653 736 HC$3.00 MF$0.65

TIME-OF-FLIGHT ELECTRON VELOCITY SPECTROMETER,
General Electric Co Schenectady N Y Research and Development Center
G. C. Baldwin, and S. I. Friedman. 7 Nov 66, 14p
Contract Nonr-3942 (00)
Availability: Published in Review of Scientific Instruments v38 n4 p519-31 Apr 1967.

Descriptors: (*Spectrometers, Electrons), (*Electron beams, Spectrometers), Electron bombardment, Probability, Measurement, Instrumentation, Counting methods, Velocity, Helium, Argon.

A velocity selector is described which is designed for measurement of the total collision cross section of electrons in the energy region below 1 V. The system determines the distributions of times of flight of single electrons over a measured path at selected pressures of a specimen gas. The electrons are generated by repetitive illumination of a photoemitter by a spark gap, pass over a shielded drift path, enter an accelerating field, and impinge on an electron multiplier. Electronic equipment and data reduction for analysis of time-of-flight and amplitude distributions of electron counts are described; data illustrative of performance are presented, including typical transmission measurements in helium and argon which extend to 150 mV. (Author)
AD-653 758 Not available from CFSTI.

MANUAL FOR ARN-3 TYPE ATMOSPHERIC NOISE MEASURING EQUIPMENT,
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 4A.
AD-653 780 HC$3.00 MF$0.65

THE U. S. NAVAL ORDNANCE LABORATORY HYPERSONIC TUNNEL,
Naval Ordnance Lab White Oak Md
F. Geineder, M. I. Schlesinger, G. Baum, and R. Cornett. 12 Apr 67, 66p Rept no. NOLTR-67-27, Aerodynamics Research-284

Descriptors: (*Hypersonic wind tunnels, Design), Aerodynamics, Ordnance laboratories, High-pressure research, Air, Hypersonic flow, Reynolds number.

The report describes the aerodynamic capability and physical plant installation of the U. S. Naval Ordnance Laboratory's Hypersonic Tunnel. The tunnel is a high pressure blowdown facility, using air as the working gas, operating at Mach numbers 5, 6, 7, 8, 9 and 10 with test section Reynolds Number from 3000 thousand to 50 million per foot. The stagnation pressure may be varied between 5 and 150 atmospheres with stagnation temperatures sufficient to prevent equilibrium condensation in the test section. (Author)
AD-653 853 HC$3.00 MF$0.65

DARE SUPPORT PACKAGE,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 9B.
AD-653 854 HC$3.00 MF$0.65

INDIRECT CALORIMETRY IN LOW PRESSURE ENVIRONMENTS.
School of Aerospace Medicine Brooks AFB Tex
For primary bibliographic entry see Field 6S.
AD-653 934 HC$3.00 MF$0.65

AN ADAPTIVE METHOD OF TEST SELECTION IN SYSTEM DEVELOPMENT,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 12B.
AD-653 942 HC$3.00 MF$0.65

AN INSTRUMENT FOR DETERMINING THE SPECTRA OF THE ELECTRIC CHARGE OF CLOUD DROPLETS.
Emmanuel Coll Boston Mass Oriental Science Library
For primary bibliographic entry see Field 4B.
AD-653 970 HC$3.00 MF$0.65

THE DAISY DECELERATOR,
Aeromedical Research Lab (6571st) Holloman AFB N Mex
Richard F. Chandler. May 67, 66p Rept no. 6571-ARL-TR-67-3

Descriptors: (*Rocket-propelled sleds, Design), Deceleration, Impact shock, Impact tests, Operation, Propulsion.

The Daisy Decelerator is a sled-track facility used for biodynamic and equipment impact testing. Since its first operational use in 1955, it has been developed to produce an impact force capability of up to 200,000 lbs (equivalent to 200 G for 1000 lb total weight), a maximum impact velocity of 175 ft/sec, and a maximum displacement during impact of 4 feet. Test sleds are available to carry one to three 250 lb test subjects in a variety of orientations relative to the impact force vector. These sleds are capable of accepting other payloads through simple adaptors. Propulsion of the sled is provided by a pneumatic piston device which accelerates the sled to the desired velocity over a distance of 42 feet. The sled is then released to coast into a waterbrake located further down the track. The waterbrake acts on the sled to provide the required impact test pulse. The water-brake force is controlled by pre-set orifices and can provide a variety of test pulse shapes limited only by the mechanical characteristics of the system. Tests have demonstrated velocity reproduced with a standard deviation of 1.6%, and deceleration reproduced with a standard deviation of 3.5%. (Author)
AD-653 972 HC$3.00 MF$0.65

A STEREOSCOPIC DISPLAY SYSTEM FOR ELECTRON MICROPROBE INSTRUMENTS.
Revised ed.,
University of Southern California Los Angeles
D. B. Wittry, and A. VanCouvering. 20 Jan 67, 3p
AFOSR-67-1410
Grants AF-AFOSR-76-66, NSF-GK-500
Revision of manuscript received 28 Nov 66.
Availability: Published in Journal Sci Instr v44 p294-5 1967.

Descriptors: (*Stereoscopic display systems, Probes), Cathode ray tubes, Electron beams, Scanning.

Signals from scanning electron beam instruments may be displayed stereoscopically by forming two cathode-ray tube isometric displays with different perspective. (Author)
AD-654 023 Not available from CFSTI.

FULL SCALE WIND TUNNEL TEST REPORT.
General Electric Co Cincinnati Ohio Advanced Technology and Demonstrator Programs Dept
For primary bibliographic entry see Field 1A.
AD-654 043 HC$3.00 MF$0.65

COARTICULATION IN VCV UTTERANCES: SPECTROGRAPHIC MEASUREMENTS,
Royal Inst of Tech Stockholm (Sweden) Speech Transmission Lab
For primary bibliographic entry see Field 20B.
AD-654 073 Not available from CFSTI.

MEASUREMENT OF THE MECHANICAL PROPERTIES OF SOLIDS AT HIGH PRESSURE.
Yale Univ New Haven Conn Dept of Engineering and Applied Science
For primary bibliographic entry see Field 20K.
AD-654 099 Not available from CFSTI.

ELECTRONIC TEST EQUIPMENT NOMENCLATURE ASSIGNMENTS. VOLUME I. 'SYSTEMS'.
New York Univ N Y Research Div
Jun 67, 170p
Contract NObsr-89288
See also Volume 2 - AD-654 107 and Volume 3 - AD-654 108.

Descriptors: (*Test sets, Classification), (*Test equipment (Electronics), Classification), Identification, Specifications.

Contents: Nomenclature designation system; Agency abbreviations; Abbreviations of technical terms; Alphanumeric listing.
AD-654 106 HC$3.00 MF$0.65

ELECTRONIC TEST EQUIPMENT NOMENCLATURE ASSIGNMENTS. VOLUME II. 'COMPONENTS'.
New York Univ N Y Research Div
Jun 67, 409p
Contract NObsr-89288
See also Volume 1 - AD-654 106 and Volume 3 - AD-654 108.

Descriptors: (*Test equipment (Electronics), Classification), Identification, Specifications.

Contents: Nomenclature designation system; Agency abbreviations; Abbreviations of technical terms; Alphanumeric listing.
AD-654 107 HC$3.00 MF$0.65

ELECTRONIC TEST EQUIPMENT NOMENCLATURE ASSIGNMENTS. VOLUME III. CROSS-REFERENCE.
New York Univ N Y Research Div
Jun 67, 166p
Contract NObsr-89288
See also Volume 1 - AD-654 106 and Volume 2 - AD-654 107.

Descriptors: (*Test equipment (Electronics), Classification), Indexes, Identification.

Part I contains a cross-reference of the data contained in Volume I - 'Systems' and Volume II - 'Components'; it is arranged by Company, Manufacturer, or Supplier in alphabetical order. For large companies with plants in many cities an attempt was made to give particular locations where the item was produced. The company name is followed by part or model numbers with their associated nomenclatures, designating test equipment (Systems or Components), made by this particular company; Part II contains part lists 'Systems', not all of which are found in Volume I, followed by those components of the System which have a test function. If no item name appears with the System heading, it may be assumed that the prime system is a system in which the test function is secondary. The components are listed in alphanumeric order with their respective titles. (Author)
AD-654 108 HC$3.00 MF$0.65

ELECTRONIC SCALE FOR MEASURING MASS FLOW.
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
LA-3659 HC$3.00 MF$0.65

EPIDEMIOLOGICAL FOLLOW-UP OF THE NEW JERSEY RADIUM CASES. I. REPORT OF THE EPIDEMIOLOGICAL AND MEDICAL STUDY GROUP AND THE PROJECT SUBCONTRACTORS. II. RESUME OF COOPERATIVE LABORATORY STUDIES ON PROJECT CASES AND SPECIMENS. III. RESUMES OF FINDINGS FROM INDIVIDUAL CASE STUDIES.
Progress rept for 10 Oct 66.
New Jersey State Dept. Of Health, West Orange. Radium Research Project.
Mar 67, 128p
Contract AT (30-1)-2181

Descriptors: (*Epidemiology, *Radium), X rays, Dentistry, Pathology, Tissues (Biology), Bone, Radiochemistry, Environment, Medical research.

For abstract, see NSA 21 13.
NYO-2181-4 HC$3.00 MF$0.65

REPORT ON THE WORK COMMON TO DORNIER SYSTEM AND THE R. A. E. CARRIED OUT AT THE ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH AND AT THE PROOF AND EXPERIMENTAL ESTABLISHMENT AT PENDINE.
Bericht Ueber Gemeinsame Arbeiten Von Dornier System Und Dem R. A. E. Biem Royal Aircraft Establishment in Farnborough Und Biem Proof and Experimental Establishment in Pendine Royal Aircraft Establishment, Farnborough (England).
G. Langbein. Nov 66, 58p RAE-LIB-TRANS-1194, RAE-LIB-TRANS-1194
Transl. Into English From German

Descriptors: *Liquid drop, *Rain erosion, *Rocket sled, Air, Aluminum, Arm, Ceramics, Drop, Erosion, Glass, Gun, Impact, Liquid, Material, Rain, Rocket, Sled, Synthetic, Water, Whirling.

For abstract, see STAR 05 15.
N67-27789 HC$3.00 MF$0.65

DESIGN CRITERIA FOR A HIGH SPEED TEST FACILITY WITH ARC HEATER AND MHD-ACCELERATOR FOR SIMULATION OF ATMOSPHERIC ENTRY.
Auslegungskriterien Fuer Eine Hochgeschwindigkeitsversuchsanlage Mit Plasmabrenner Und Mhdbeschleuniger Zur Simulation des Wiedereintritts in Die Erdatmosphaere
Industrieanlagen-betriebsgesellschaft M.B.H., Ottobrunn (West Germany).
H. Fritzsche. 1966, 39p DGRR/WGLR PAPER-66-115
in German, English Summary Presented At the Ann. Joint Meeting grr/Wglr, Bad Godesberg, W. Germany, Oct. 1966

Descriptors: *Arc heating, *Atmospheric entry, *Hypervelocity wind tunnel, *Magnetohydrodynamic acceleration, Acceleration, Arc, Atmospheric, Enthalpy, Heating, Magnetohydrodynamic, Plasma, Simulation, Tunnel, Wind.

For abstract, see STAR 05 15.
N67-27806 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF NONEQUILIBRIUM CORNER EXPANSION FLOWS OF DISSOCIATED OXYGEN.
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 15.
N67-28617 HC$3.00 MF$0.65

LOW TEMPERATURE TECHNIQUES AND AERONAUTICS.
Tieftemperaturtechnik Und Raumfahrt
Linde A. G., Hollriegelskreuth (West Germany).
W. Baldus. 1966, 7p DGRR/WGLR PAPER-66-042
in German, English Summary Presented At the Ann. Joint Meeting grr/Wglr, Bad Godesberg, W. Germany, Oct. 1966

Descriptors: *Conference, *Cryogenic temperature, *Low temperature physics, *Space simulation, *Test facility, Chamber, Cryogenic, Cryopumping, Environment, Facility, Low temperature, Oxidizer, Physics, Propellant, Radiation, Rocket, Shroud, Simulation, Space, Temperature, Test, Vacuum.

For abstract, see STAR 05 15.
N67-28702 HC$3.00 MF$0.65

ATOMIC SPECTROSCOPY WITH THE SHOCK TUBE.
Maryland Univ., College Park.
For primary bibliographic entry see Field 20H.
For abstract, see STAR 05 15.
N67-28764 HC$3.00 MF$0.65

A STUDY OF ADVANCED INFRARED DETECTORS FOR USE IN PLANETARY SPECTROSCOPY SEMIANNUAL REPORT, 1 OCT. 1966 - 31 MAR. 1967.
California Univ., Berkeley. Space Sciences Lab.
H. Weaver. 31 Mar 67, 27p NASA-CR-84824
Grant NSG-707
Its Lab. Ser. No. 8, Issue No. 46

Descriptors: *Bolometer, *Field effect transistor (fet), *Infrared detector, *Parametric amplifier, Amplifier, Astronomy, Detector, Fet, Germanium, Infrared, Low noise, Parameter, Planetary, Resistance, Spectroscopy.

For abstract, see STAR 05 15.
N67-28784 HC$3.00 MF$0.65

FUEL CELL RELIABILITY ASSESSMENT QUARTERLY PROGRESS REPORT, 8 JAN. - 8 APR. 1967.
Allis-chalmers Mfg. Co., Milwaukee, Wis.
For primary bibliographic entry see Field 10A.
For abstract, see STAR 05 15.
N67-28786 HC$3.00 MF$0.65

INVESTIGATIONS OF MHD ACCELERATORS FOR WIND TUNNEL APPLICATIONS.
Untersuchungen An Einem Mhd- Nachbeschleuniger Fuer Windkanaele
Siemens-schuckertwerke A. G., Erlangen (West Germany). Forschungslaboratorium.
H. Wittel. 1966, 26p
in German, English Summary Presented At the Ann. Joint Meeting grr/Wglr, Bad Godesberg, W. Germany, Oct. 1966 Its Meeting Paper No. 66-116

Descriptors: *Hypervelocity wind tunnel, *Magnetohydrodynamic acceleration, Acceleration, Accelerator, Boundary, Conductivity, Conference, Electric, Electrode, Gas, Hypervelocity, Layer, Magnetohydrodynamic, Plasma, Reentry, Simulation, Tunnel, Wind.

For abstract, see STAR 05 15.
N67-28802 HC$3.00 MF$0.65

REACTOR CHEMISTRY DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING DECEMBER 31, 1966.
Oak Ridge National Lab., Tenn.
Mar 67, 202p
Contract W-7405-eng-26

Descriptors: (*Crystallography, Phase studies), (*Single crystals, Nuclear radiation), (*Gas-cooled reactors, *Fission products), Reactor safety systems.

For abstract, see NSA 21 13.
ORNL-4076 HC$3.00 MF$0.65

SIGNAL GENERATOR SG-31A/U.
Burroughs Corp., Paoli, Pa. Field Engineering and Support Div.
For primary bibliographic entry see Field 9C.
PB-174 852 HC$3.00 MF$0.65

FREQUENCY SELECTIVE VOLTMETER SIERRA 125.
Lockheed Electronics Co., Clark, N. J.
For primary bibliographic entry see Field 9C.
PB-174 862 HC$3.00 MF$0.65

MAGNETIC DETECTOR TEST SET, MODEL AN/ASM-6A.
Naval Air Systems Command, Washington, D. C.
For primary bibliographic entry see Field 9C.
PB-174 863 HC$3.00 MF$0.65

ENGINE GENERATOR ANALYZER SET, AN/USM-86, AN/USM-86A, AN/USM-86B.
Bureau of Naval Weapons Representative, Pomona, Calif. Meteorology Engineering Center.
For primary bibliographic entry see Field 9C.
PB-174 864 HC$3.00 MF$0.65

R-F BRIDGE GEB 1606-A (GENERAL RADIO).
Bureau of Naval Personnel Representative, Pomona, Calif. Metrology Engineering Center.

For primary bibliographic entry see Field 9C.
PB-174 884 HC$3.00 MF$0.65

MICROWAVE POWER METER HEWLETT-PACKARD 431C.
Bureau of Naval Personnel Representative, Pomona, Calif. Metrology Engineering Center.
For primary bibliographic entry see Field 9C.
PB-174 887 HC$3.00 MF$0.65

RADIO TEST SET AN/ARM-22.
Bureau of Naval Representative, Pomona, Calif. Metrology Engineering Center.
For primary bibliographic entry see Field 9C.
PB-174 916 HC$3.00 MF$0.65

RADAR SIGNAL SIMULATOR SM-65UP.
Harco Engineering, Terminal Island, Calif.
For primary bibliographic entry see Field 9C.
PB-174 931 HC$3.00 MF$0.65

14D. RELIABILITY

BAYESIAN METHODS AND RELIABILITY GROWTH.
Technical rept. research paper,
Naval Postgraduate School Monterey Calif
Harold J. Larson. Mar 67, 33p Rept no. TR/RP-78

Descriptors: (*Reliability, Military requirements), (*Failure (Mechanics), *Probability), Performance (Engineering), Random variables, Statistical analysis, Interpolation, Least squares method, Multivariate analysis, Integration, Statistical distributions.

A particular model is proposed for reliability growth and a prior distribution is assumed on the parameters. Various statements regarding the final reliability are then derived; a numerical example is included.
AD-653 460 HC$3.00 MF$0.65

FAILURE-ERASURE CIRCUITRY: A DUPLICATIVE TECHNIQUE OF FAILURE-MASKING SYSTEMS.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 9B.
AD-653 674 Not available from CFSTI.

14E. REPROGRAPHY

AN INTRODUCTION TO THE PROBLEM OF PHOTOGRAPHING ARTIFICIAL SATELLITES,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 405 Not available from CFSTI.

SOME EARLY TRIALS OF ASTRONOMICAL PHOTOGRAPHY BY TELEVISION METHODS,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 406 Not available from CFSTI.

ASTRONOMICAL OBSERVATIONS BY MEANS OF HIGHLY SENSITIVE ELECTRONIC LIGHT AMPLIFICATION,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 407 Not available from CFSTI.

THE LIMITATIONS FOR NIGHT-TIME DETECTION OF CELESTIAL BODIES EMPLOYING THE INTENSIFIER-STORAGE-IMAGE ORTHICON,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 416 Not available from CFSTI.

DEVELOPMENT OF AN EXPLORATORY DEVELOPMENTAL PHOTOGRAPHIC CONTACT AND PROJECTION PRINTER.
Final rept., 22 Jun 65-30 Dec 66,
Itek Corp Lexington Mass
J. L. Breitbord, and R. E. Morris. J n 67, 58p
ECOM-00177-F
Contract DA-28-043-AMC-00177 (E)

Descriptors: (*Photographic printers, *Projection printers), Contact printers, Automatic, Time, Photographic film, Sensitivity, Photographic equipment, Exposure meters, Phosphorescent materials, Mathematical analysis, Design, Power, Vacuum apparatus, Density, Graphics, Tests.

Under contract DA 28-043 AMC-00177 (E), Itek has designed and fabricated a multifunction contact and projection printer capable of making 2x and 4x enlargements and of performing contact printing in a step and repeat mode. In addition, the printer provides automatic dodging, automatic exposure control, contrast control, automatic registration of the negative, and multiple copies of any single negative. The printer can handle 500-foot rolls of 7 -millimeter, 5-inch, and 9 1/2-inch duplicating film, as well as 9 3/8-inch variable contrast paper. With the exception of the print cycle (design goal was 3 seconds, excluding the exposure duration of 4 seconds), the numerous and difficult specifications in the SCL-4611 technical requirements have been met. With a 4-second exposure, relatively good exposures can be obtained in the 4x enlargement modes. The dodging in this mode was 20 percent. Resolutions on the order of 100 lines per millimeter AWAR have been obtained in the 2x and 4x enlargement modes. In the contact mode, the resolution is approximately 50 lines per millimeter. Dodging on the order of 60 to 70 percent can be obtained in the 2x and contact modes. The registration function operates reliably. The automatic exposure control is very sensitive; it operates well in the 2x and 4x enlargement modes. The unit tracks all the duplicating film formats as well as the variable contrast paper. Because of its operational simplicity, the phosphor quench dodging technique is distinctly superior to other methods of dodging; however, the numerous other functions required by this printer make it a highly complex unit. (Author)
AD-653 625 HC$3.00 MF$0.65

BAKER- NUNN PHOTOGRAPHY OF THE INTELSAT 2- F2 APOGEE-MOTOR FIRING.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 15.
N67-28766 HC$3.00 MF$0.65

15. MILITARY SCIENCES

15C. DEFENSE

KINSHIP AND VOLUNTARY ORGANIZATION IN POST-THERMONUCLEAR ATTACK SOCIETY: SOME EXPLORATORY STUDIES,
Human Sciences Research Inc Mclean Va
For primary bibliographic entry see Field 5K.
AD-653 466 HC$3.00 MF$0.65

VULNERABILITIES OF SOCIAL STRUCTURE: STUDIES OF THE SOCIAL DIMENSIONS OF NUCLEAR ATTACK,
Human Sciences Research Inc Mclean Va
For primary bibliographic entry see Field 5K.
AD-653 468 HC$3.00 MF$0.65

CIVIL DEFENSE IN POST-ATTACK SOCIETY: A SUMMARY REPORT FROM A RESEARCH PROGRAM,
Human Sciences Research Inc Mclean Va
Peter G. Nordlie, and S. D. Vestermark, Jr. Feb 67, 70p Rept no. HSR-RR-67/2-Me
Prepared in cooperation with Stanford Research, Inst., Menlo Park, Calif., Contract OCD-PS-64-201.

Descriptors: (*Civil defense systems, Reports), Nuclear radiation, Psychological warfare, Nuclear explosion damage, Effectiveness, Disasters, Recovery, Organizations, Social psychology, Public opinion, Fear, Rehabilitation, Urban areas, Costs, Design, Transportation, Communication systems, Feasibility studies, Management engineering, Industries, Population.

The special report is for a special purpose. It is addressed to those who have responsibilities for creating civil defense capabilities. The report is an attempt by the authors to summarize what of practical significance for that audience they have learned so far from a long-term research program on the likely social and psychological effects of a nuclear attack, the social vulnerabilities of American society to nuclear attack, and problems of societal recovery from nuclear attack. The Civil Defense Task. In this section, the implications of the findings from research on social and psychological effects of nuclear attack for the definition and delineation of the civil defense task are stated. Major points made are: that a society-wide frame of reference is required for meaningful definitions of civil defense objectives and missions, and societal recovery is the appropriate objective of civil defense planning. Some Prototypical Systems. The implications of the research findings for civil defense planning are summarized in the form of four proposed activities: development of comprehensive methods for assessing the effectiveness and social costs of proposed civil defense measures. Four major generalizations on crisis and recovery are given. (Author)
AD-653 472 HC$3.00 MF$0.65

SHELTER OCCUPANCY STUDIES-UNIVERSITY OF GEORGIA (1966). VOLUME II. COMMUNITY FALLOUT SHELTER HANDBOOK FOR UNTRAINED MANAGEMENT.
Ed. no. 7,
Georgia Univ Athens Civil Defense Research
John A. Hammes, and Thomas R. Ahearn. 31 Dec 66, 147p
Contract OCD-PS-66-25
Continuation of Contract OCD-PS-65-45. See also Volume 1, AD-653 881.

Descriptors: (*Fallout shelters, Management engineering), Handbooks, Instruction manuals, Leadership, Civil defense systems, Training, Civil defense personnel, Medical supplies, Confined environments, Nutrition, Recreation, Sanitary engineering, Medical examination.

An instruction manual is presented for temporary shelter managers. A handbook for permanent shelter managers is also included.
AD-653 879 HC$3.00 MF$0.65

SHELTER OCCUPANCY STUDIES AT THE UNIVERSITY OF GEORGIA (1966), VOLUME I.
Final rept.,
Georgia Univ Athens Civil Defense Research
John A. Hammes, and Thomas R. Ahearn. 31 Dec 66, 403p
Contract OCD-PS-66-25
Continuation of Contract OCD-PS-65-45. See also Volume 2, AD-653 879.

Descriptors: (*Fallout shelters, Management engineering), Experimental design, Leadership, Civil

defense systems, Training, Civil defense personnel, Medical supplies, Confined environments, Sanitary engineering, Nutrition, Medical examination, Personality tests, Toilet facilities, Recreation, Handbooks.

In the period 1962-66, the Civil Defense Research staff at the University of Georgia has conducted ten simulated fallout shelter occupancy studies. These tests involved healthy men, women, and children, nine months through seventy-three years of age, in groups of thirty to five hundred persons, confined for periods of two days to two weeks under rather austere shelter conditions. Detailed findings of these occupancy tests have been presented in previous annual reports. The present report contains findings of the 1966 occupancy tests, as well as a synthesis of all studies to date, and the implications for research in the National Shelter Program. A research prototype Community Shelter Handbook for Untrained Management is included. (Author)
AD-653 881 HC$3.00 MF$0.65

15E. LOGISTICS

AUXILIARY HEATED HANDWEAR FOR ARCTIC MAINTENANCE PERSONNEL.
Arctic Aeromedical Lab Fort Wainwright Alaska
For primary bibliographic entry see Field 6Q.
AD-653 532 HC$3.00 MF$0.65

PROCUREMENT: MULTIPLE INCENTIVE CONTRACTING, SCIENTIFIC CONTRACTING WITH ACCENT ON TRADE-OFF,
Army Aviation Materiel Command St Louis Mo
For primary bibliographic entry see Field 5C.
AD-653 643 HC$3.00 MF$0.65

MILITARY APPLICATIONS OF PLASTICS AND RELATED MATERIALS,
Plastics Technical Evaluation Center Dover N. J.
For primary bibliographic entry see Field 11I.
AD-653 837 HC$3.00 MF$0.65

OPTIMALITY OF MYOPIC INVENTORY POLICIES FOR SEVERAL SUBSTITUTE PRODUCTS.
Technical rept.,
Stanford Univ Calif Dept of Operations Research
Edward Ignall, and Arthur F. Veinott, Jr. 20 Jun 67, 51p Rept no. TR-8
Contract Nonr-225 (77)
Prepared in cooperation with Columbia Univ., New York. Contract Nonr-266 (55).

Descriptors: (*Procurement, Decision making), (*Inventory, Optimization), Inventory analysis, Inventory control, Costs, Nonlinear programming, Dynamic programming, Stochastic processes.

Multiproduct inventory systems with proportional ordering costs and stochastic demands are studied. New conditions are obtained under which a myopic ordering policy (a policy of minimizing expected cost in the current period alone) is optimal for a sequence of periods for all initial inventory levels. An important one of these, the substitute property, holds when the myopic policy is such that increasing the initial inventory of one product does not increase the quantity ordered of any product. Conditions on the one period expected holding and shortage cost function, which are of independent interest in nonlinear programming, are shown to imply the substitute property. Applications of these conditions to models with storage or investment limitations and to a multiechelon model are given. Under backlogging the usual extension to a fixed delivery lag is obtained. Some non-stationary cases are also treated. (Author)
AD-653 885 HC$3.00 MF$0.65

HEADWAY AND SWITCHING STRATEGIES FOR AUTOMATED VEHICULAR GROUND TRANSPORTATION SYSTEMS,
Massachusetts Inst. of Tech., Cambridge. Engineering Projects Lab.
For primary bibliographic entry see Field 13F.
PB-173 644 HC$3.00 MF$0.65

ANALYSIS OF VSTOL AIRCRAFT CONFIGURATIONS FOR SHORT HAUL AIR TRANSPORTATION SYSTEMS.
Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
For primary bibliographic entry see Field 1C.
PB-174 912 HC$3.00 MF$0.65

COMPUTERIZED SCHEDULE CONSTRUCTION FOR AN AIRLINE TRANSPORTATION SYSTEM.
Technical rept.,
Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
Robert W. Simpson. Nov 66, 97p FT-66-3
Contracts C-136-66, C-85-65

Descriptors: (*Air transportation, *Scheduling), Time, Computer programs, Tables, Programming (Computers), Frequency, Aircraft, Maps, Air traffic.
Identifiers: VTOL.

The report describes the work which has been carried out for a hypothetical Airbus short haul V/STOL system in the Northeast Corridor. It is only a beginning as valuable extensions are yet to come as more applications come into the open literature. The main presentation describes the computerized processes developed to construct a schedule plan assuming certain demand and operating data. An interesting extension showing the application of network flow theory to a more detailed representation of the schedule is also described. A map of the corridor showing the terminals selected for the Airbus system is shown and some typical distances, travel times, and projected fares for the 1980 Airbus.
PB-174 913 HC$3.00 MF$0.65

15F. NUCLEAR WARFARE

DEVELOPMENT OF AN IMPROVED LAND-SURFACE FALLOUT MODEL. PART II. ATMOSPHERIC TRANSPORT.
Technical Operations Inc Burlington Mass
For primary bibliographic entry see Field 18C.
AD-653 633 HC$3.00 MF$0.65

15G. OPERATIONS, STRATEGY, AND TACTICS

FEASIBILITY OF USING FLUORESCENT COLORANTS TO AFFORD CAMOUFLAGE PROTECTION AGAINST PHOTOGRAPHIC DETECTION,
Army Natick Labs Mass Clothing and Organic Materials Div
For primary bibliographic entry see Field 11C.
AD-653 604 HC$3.00 MF$0.65

TEMPER AS A MODEL OF INTERNATIONAL RELATIONS: AN EVALUATION FOR THE JOINT WAR GAMES AGENCY DEPARTMENT OF DEFENSE.
Final rept.,
Simulmatics Corp Cambridge Mass
Michael F. Cook, Michael J. White, Walter C. Clemens, and Ithiel de Sola Pool. Dec 66, 137p Rept no. SIM/CAM/2/67
Contract DCA100-66-C-0088

Descriptors: (*War games, Models (Simulations)), Department of Defense, Computer programs, Cold war, Foreign policy, Problem solving, Decision making, Political science.
Identifiers: TEMPER.

An evaluation is presented of the TEMPER model as a representation of, and a tool for, the analysis of international relations. The major assumptions implicit in the model were examined and assessed to determine their degree of scientific validation, relevance to problems of crisis management, and relevance to decisions of the U.S. and the Department of Defense. Equations and computer routines dealing with political aspects of the model were analyzed. Recommendations were made to eliminate, modify or combine routines, correct errors and ambiguities, and simplify propositions embedded in the model. Strengths and novel features of the TEMPER design were also identified. The most radical recommendation in this report is to transform TEMPER into a family of partial models for man-machine interaction in the analysis of international crisis. Time-sharing now makes this practicable. TEMPER is potentially a powerful device for the study of international relations. (Author)
AD-653 606 HC$3.00 MF$0.65

INEQUALITY AND INSURGENCY: A STATISTICAL STUDY OF SOUTH VIETNAM,
Rand Corp Santa Monica Calif
Edward J. Mitchell. Jun 67, 24p Rept no. P-3610

Descriptors: (*Insurgency, *Vietnam), (*Group dynamics, *Behavior), Political science, Terrain, Distribution (Economics), Government (Foreign), Population, Agriculture, Statistical analysis, Cereals.

There appears to be two contrary theories of rebellion, each with some basis in fact: in one, peasants revolt when they are poor; in the other, when they are better off. Determining which of these opposing views is correct, or more properly, under what circumstances each is correct, is not within the scope of this paper. Instead, the author concentrates on their application to one particular and vital situation--Vietnam.
AD-653 938 HC$3.00 MF$0.65

INSURGENCY AS A STRATEGIC PROBLEM,
Rand Corp Santa Monica Calif
P. Kecskemeti. Feb 67, 45p Rept no. RM-5160-PR
Contract F44620-67-C-0045

Descriptors: (*Insurgency, *Vietnam), (*Counter-insurgency, Political science), Communists, United States government, Deterrence, Strategic warfare, Motivation, Africa, Latin America.

Examination of the major recent historical examples of insurgency reveals that its main causes are to be sought not in economic deprivation but in political factors such as alien rule or foreign invasion. Nationalist and peasant-populist aspirations provided the principal motives for joining insurgent forces. The Communist succeeded in controlling insurgencies only when special historical circumstances prevailed; elsewhere the decisive control positions remained in non-Communist hands. Removing the political causes of insurgency ('crisis management') is beyond the capability of any single administrative agency, and in any case cannot be undertaken by political machinery operating from outside; but to the extent that insurgency is of nationalist or populist origins, this does not imply any fatal weakness of the U.S. security posture in relation to 'undeterrable' forms of Communist aggression.
AD-653 943 HC$3.00 MF$0.65

16. MISSILE TECHNOLOGY

16B. MISSILE TRAJECTORIES

CAVITY SHAPES AT VERTICAL WATER ENTRY, A COMPARISON OF CALCULATED AND OBSERVED SHAPES,
Naval Ordnance Plant Alexandria Va
Harvey I. Abelson. 23 Jan 67, 27p Rept no. NOLTR-67-31, Ballastics Research-171

Descriptors: (*Guided missiles, *Water entry), Nose cones, Geometric forms, Spheres, Fluid dynamic properties, Cavitation, Kinetic energy, Hydrodynamic configurations.

For vertical water entries which result in the formation of open cavities, the cavity shapes as predicted by Birkhoff's hydraulic flow model are shown to correspond very well to observed cavity shapes for spheres of different sizes and materials. (Author)
AD-653 717 HC$3.00 MF$0.65

17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17B. COMMUNICATIONS

AN IMPROVED SYSTEM FOR RECORDING THE PHASE AND AMPLITUDE OF VLF AND LF STANDARD FREQUENCY TRANSMISSION,
National Bureau of Standards, Boulder, Colo.
A. H. Diede. 28 Jan 64, 86p NBS-8215

Descriptors: (*Recording systems, *Very low frequency), (*Low frequency, *Signals), Frequency multipliers, Transistors, Circuits, Phase measurement, Amplitude modulation, Oscillators, Synthesis, Radio transmission, Stability.

An improved system for recording the relative phase and amplitude of frequency stabilized LF and VLF transmissions is described. The versatility and ease of maintenance of the system has been greatly improved by the use of modular construction and plug-in printed circuit boards. This type of construction will enable the system to meet any anticipated requirements for coherent measurements in the LF and VLF region. The very low power dissipation of the transistor circuits used increases the reliability and long term stability of the coherent circuits. (Author)
AD-433 249 HC$3.00

SOME EARLY TRIALS OF ASTRONOMICAL PHOTOGRAPHY BY TELEVISION METHODS,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 406 Not available from CFSTI.

ASTRONOMICAL OBSERVATIONS BY MEANS OF HIGHLY SENSITIVE ELECTRONIC LIGHT AMPLIFICATION,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 407 Not available from CFSTI.

THE LIMITATIONS FOR NIGHT-TIME DETECTION OF CELESTIAL BODIES EMPLOYING THE INTENSIFIER-STORAGE-IMAGE ORTHICON,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 416 Not available from CFSTI.

THE CORRECTION OF HELIUM SPEECH DISTORTION.
Final rept., May 66-May 67
HRB-Singer Inc State College Pa
R. S. Brubaker, and J. W. Wurst. May 67, 49p
Rept no. HRB-4007-F-1
Contract N00014-66-C-0228

Descriptors: (*Helium, Speech), (*Speech, Intelligibility), (*Closed ecological systems, Speech), Circuits, Digital systems, Real time, Distortion, Speech recognition, Underwater communication systems, Microphones, Phonetics, Modulators, Amplifiers, Voice communication systems, Life support, Speech transmission.
Identifiers: Donald Duck effect.

A technique for removing the distortion inherent in speech uttered in a helium-rich atmosphere is the object of considerable research. The report describes an approach which corrects the formant frequencies and the vowel-consonant ratios, two factors which are the most affected by the helium environment. The correction process occurs in real time, the signal suffering less than 10 milliseconds delay. Because the circuitry is largely digital, processor volume is estimated to be about 10 cubic inches after the first step toward microminiaturization is taken. (Author)
AD-653 471 HC$3.00 MF$0.65

SPEECH IN AN ARTIFICIAL ATMOSPHERE (44% OXYGEN-56% HELIUM).
Final rept., Feb 65-Jul 66,
Aerospace Medical Research Labs Wright-Patterson AFB Ohio
Charles W. Nixon, Frank Trimboli, William E. Mabson, James E. Endicott, and B. E. Welch.
Dec 66, 29p Rept no. AMRL-TR-66-165
Prepared in cooperation with Dayton Univ. Research Inst., Ohio, and School of Aviation Medicine, Randolph AFB, Tex.

Descriptors: (*Helium, Speech), (*Speech, Intelligibility), Closed ecological systems, Life support, Space simulation chambers, Speech transmission, Phonetics, Space medicine.
Identifiers: Donald Duck effect.

Intelligibility and physical characteristics of helium speech were investigated during a simulated space mission at Brooks Air Force Base, Texas. Speech was produced under conditions of room air at ground level, 100% oxygen at 18,000 feet, 56% helium-44% oxygen at 18,000 feet, and 80% helium-20% oxygen at ground level. Results of both objective and subjective analyses of the data show that (1) word intelligibility in the 80% helium condition was less than in room air, (2) when in the presence of noise, intelligibility was less in both 56% and 80% helium mixtures than in room air, (3) the high fundamental pitch observed immediately upon entering the helium atmosphere gradually decreased, but did not return to the pre-helium level of pitch, (4) measured rate of speaking was unaffected, and (5) mean second formant frequencies were 1.35 times higher in 56% helium and 1.62 times higher in 80% helium than in room air. Observed ratios were slightly less than ratios predicted on the basis of velocity of sound in the vocal tract. (Author)
AD-653 519 HC$3.00 MF$0.65

LIMITING INFORMATION CONTENT OF TELEVISION SIGNAL,
Foreign Technology Div Wright-Patterson AFB Ohio
Chiung-pan Chou. 25 Jan 67, 28p Rept no. FTD-HT-66-592
TT-67-62104
Edited trans. of Tien Tzu Hzueh Pao (Chinese People's Republic), n4 p24-39 1964.

Descriptors: (*Television equipment, *Signals), Video signals, Bandwidth, Color television, Telemeter systems, Mathematical analysis, Theory, China.

The author discusses the bandwidth compression and limiting information content of television (TV) signals. Equation is used to determine the information content of stereophonic signals, remote control signals, telemetering signals, and monochrome TV signals. As indicated the necessary TV channel bandwidth can be compressed 4 times by pseudorandom scanning, 2 times by elimination of interferences between scanning lines, and 28 times by adoption of sweeps having a variable duration. The max bandwidth compression ratio for monochrome TV signals is 320-520. The limiting information content of color TV signals can be estimated roughly. The channel bandwidth of color TV signals can be compressed by improving the random vector field structure. The bandwidth of stereo-TV signals is compressed by eliminating the interferences between pictures. The author urges that extensive studies must be made on mathematical theories to solve the information content problems, on TV signal characteristics and visual sensation of human eyes, and on the practical use of bandwidth compression methods. (Author)
AD-653 529 HC$3.00 MF$0.65

RESEARCH-ENGINEERING AND SUPPORT FOR TROPICAL COMMUNICATIONS.
Semiannual rept. no. 6, 1 Oct 65-31 Mar 66,
Stanford Research Inst Menlo Park Calif
G. H. Hagn, E. L. Younker, and H. W. Parker.
Jun 66, 85p
Contract DA-36-039-AMC-00040 (E), ARPA Order-371
See also AD-653 615.

Descriptors: (*Radio communication systems, *Armed forces research), (*Radio equipment, Tropical regions), Environmental tests, Lightning, Noise (Radio), Thailand, Performance (Engineering), Radio signals, Antenna radiation patterns, Ionosphere, Jungles.

The work described in this report was performed with the support, and using the facilities, of the Military Research and Development Center at Bangkok, Thailand, a joint Thailand/United States organization. The cooperation of staff members of the Thailand Ministry of Defense, the United States Advanced Research Projects Agency, and the United States Army Electronics Command made possible the work described. This report summarizes the technical effort conducted under Contract DA 36-039-AMC-00040 (E) for the period covering 1 October 1965 through 31 March 1966. In several cases, work described has been conducted by Thai personnel assigned to the Military Research and Development Center. Readers interested in additional technical detail of work accomplished are urged to consult the published reports listed in Sec. III. These reports present detailed discussions of specific scientific investigations. The operations analysis work conducted under the contract will be reported separately in accordance with a special report schedule.
AD-653 608 HC$3.00 MF$0.65

INITIAL VHF PROPAGATION RESULTS USING XELEDOP TECHNIQUES AND LOW ANTENNA HEIGHTS.
Special technical rept.,
Stanford Research Inst Menlo Park Calif
N. K. Shrauger, and K. L. Taylor. Dec 66, 83p
Rept no. SRI-Special TR-26
Contract DA-36-039-AMC-00040 (E), ARPA Order-371

Descriptors: (*Radio communication systems, *Armed forces research), (*Radio equipment, Tropical regions), Radio transmission, Radio signals, Ionospheric propagation, Thailand, Terrain, Very high frequency, Performance (Engineering), Dipole antennas, Antenna radiation patterns, Environmental tests, Mobility, Beaches, Plants (Botany).

An adaptation of the Xeledop technique for study of propagation problems associated with VHF manpack radios is described and the results of initial VHF propagation tests for several frequencies, polarizations, and terrains for low antenna heights are presented. Initial results show that the choice of frequency and antenna polarization has a significant effect on propagation in a situation similar to a possible employment of manpack radio sets. Vertical polarization was found to be superior for transmission of signals over open terrain; horizontal polarization was superior for the foliage-covered terrain of the tests. The effect of frequency was also examined and it was found that the type of terrain generally has less effect on the received signals as the transmission frequency is increased from 50 to 100 MHz. Future propagation studies and measurements using the Xeledop technique are suggested.
AD-653 609 HC$3.00 MF$0.65

RESEARCH-ENGINEERING AND SUPPORT FOR TROPICAL COMMUNICATIONS.
Semiannual rept. no. 7, 1 Apr-30 Sep 66,
Stanford Research Inst Menlo Park Calif
E. L. Younker, G. H. Hagn, and H. W. Parker.
Sep 66, 80p
Contract DA-36-039-AMC-00040 (E), ARPA Order-371
See also AD-653 608.

Descriptors: (*Radio communication systems, *Armed forces research), (*Radio equipment, Tropical regions), Environmental tests, Noise (Radio), Radio signals, Thailand, Performance (Engineering), Ionospheric propagation, Antenna radiation patterns, Jungles.

Communications research in a tropical environment is needed to develop improved equipment and techniques for use by military forces in Southeast Asia and other areas of similar environment. This report covers the following research effort in Thailand during 1 April through 30 September 1966: (1) Radio noise study and measurement. (2) Ionospheric electron content studies using Faraday rotation techniques on signals from beacon satellite S66; studies on ionospheric stability through Doppler technique applied to signal frequency dispersion, a study of disturbances in the earth's field using magnetometers. (3) Investigation of ionospheric factors related to local frequency prediction using oblique-incidence sounders. (4) Investigation of the effects of the tropical environment on antenna performance using airborne and man-carried antenna-pattern measuring systems (Xeledops); measurement of earth and vegetation electrical constants; theoretical model studies related to them.
AD-653 615 HC$3.00 MF$0.65

ATMOSPHERIC RADIO NOISE DATA, BANGKOK, THAILAND, MARCH-MAY 1966.
Geophysical data rept., Mar-May 66,
Stanford Research Inst Menlo Park Calif
Rangsit Chindahporn, Prajuab Nimityongskul, and Chaikamol Lumjiak. Jan 67, 20p
Contract DA-36-039-AMC-00040 (E), ARPA Order-371

Descriptors: (*Atmospherics, *Noise (Radio)), Recording systems, Antennas, Medium frequency, Radio relay stations, Low frequency, Tables, High frequency, Maps, Very low frequency, Periodic variations, Thailand.
Identifiers: SEACORE.

Contents: ARN-3 atmospheric radio noise measuring equipment; Location of the radio noise recording station at Laem Chabang, Thailand; Radio noise recording station; Nomogram for transforming effective antenna noise figure to noise field strength as a function of frequency; Three-month median time-block values of radio noise power; Radio noise measuring site at Laem Chabang, Thailand; ARN-3 radio noise recorder specifications; Month-hour values of radio noise; Three-month time-block values of radio noise. (Author)
AD-653 616 HC$3.00 MF$0.65

LAST OF THE WEST FORD DIPOLES.
Journal article,
Massachusetts Inst of Tech Lexington Lincoln Lab
Irwin I. Shapiro. 29 Jun 66, 5p Rept no. JA-2807
ESD-TR-67-196
Contract AF 19 (628)-5167
Availability: Published in Science, v154 n3755 p1445-8 1966.

Descriptors: (*Radio communication systems, *Reflectors), Radar, Detection, Communication satellites (Passive), Copper, Wire.

Radar measurements confirm that the several hundred million individually orbiting West Ford dipoles reentered the lower atmosphere in precise accord with predictions. Calculations indicate that these tiny copper wires survived reentry and floated gently back to Earth; unfortunately, the probability of finding one is minuscule. Some dipole clusters remain in orbit but almost all should return to Earth within the next 2 years. (Author)
AD-653 675 Not available from CFSTI.

DEVELOPMENT OF EAR PROTECTOR, ELECTROACOUSTIC MX-7307 ( ) / UIC.
CBS Labs Stamford Conn
For primary bibliographic entry see Field 6Q.
AD-653 794 HC$3.00 MF$0.65

USE OF SOLAR RADIO NOISE BURST DATA TO FORECAST HIGH FREQUENCY RADIO PROPAGATION DISTURBANCES,
Naval Ordnance Lab Corona Calif
Verne E. Hildebrand. 21 Jun 67, 47p Rept no. NOLC-718

Descriptors: (*Radio interference, *Extraterrestrial radio waves), Ionospheric disturbances, Solar flares, Data, Predictions, High frequency, Propagation.

The potential information derivable from radio noise bursts associated with solar flares is analyzed to determine its value for forecasting disturbances on HF communication links. Recommendations are made for measurements to confirm the value of certain burst relationships as heralds of an ionospheric disturbance. (Author)
AD-653 852 HC$3.00 MF$0.65

SUR L'ETUDE DE L'AMPLITUDE DU CHAMP RADIOELECTRIQUE D'UN SATELLITE A L'HORIZON DE LA STATION (On the Study of the Amplitude of the Radioelectric Field of a Satellite at the Horizon of the Station),
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 20N.
AD-653 930 HC$3.00 MF$0.65

RAY PENETRATING INTO THE FUTURE ULTRADISTANT COSMIC COMMUNICATION LIGHT PULSES OF SATELLITES,
Foreign Technology Div Wright-Patterson AFB Ohio
N. Aleksandrov. 21 Feb 67, 13p Rept no. FTD-HT-66-439
TT-67-62146
Luch, Pronikayushchii v Budushchee ... , unedited rough draft trans. of Nauchno-Tekhnicheskie Obshchestva SSSR, v6 n8 p41-3 1964.

Descriptors: (*Light communication systems, *Lasers), Semiconductors, Gallium arsenides, Relativity theory, Space communication systems, Satellites (Artificial).

The Lenin Prize for 1964 was presented to Associate Member of the AN SSSR Bentsion Vul and a large group of coworkers for the development of a gallium-arsenide semiconductor laser. The semiconductor laser is almost 100% efficient and its microminiature size holds great promise for use in computers to achieve speeds of tens of billions of operations per second. Direct communication over distances of several light years is considered possible with the use of lasers. Satellites carrying a laser could be easily seen and accurately tracked both day and night. Applications of lasers in radio, telephone and television communications and in chemistry are mentioned. Quantum techniques make possible a construction of clocks accurate to one second in ten thousand years which could be used to conduct relativity experiments. Use of the laser beam as a metal working and surgical tool is mentioned. Long distance, high-efficiency transmission of energy by laser beam, especially in space where the absorbing and scattering effects of the atmosphere are avoided, is considered absolutely essential in the conquest of space. Direct conversion of matter into energy without explosion is possible using quantum devices. Quantum engines may utilize solar energy during space flight. (Author)
AD-653 962 HC$3.00 MF$0.65

SURVEY OF IONOSPHERIC IRREGULARITIES OVER EUROPE,
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 4A.
AD-654 036 HC$3.00 MF$0.65

PERCEPTION OF SEGMENTS OF VCCV UTTERANCES,
Royal Inst of Tech Stockholm (Sweden) Speech Transmission Lab
S. E. G. Ohman. 1966, 11p
AFCRL-67-0287
Revision of Rept. no. 25, 1 Mar 62. Research supported in part by NIH and U. S. Army.
Availability: Published in Journal of Acoustical Society of America v40 n5 p979-98 Nov 1966.

Descriptors: (*Speech, Intelligibility), (*Speech recognition, Phonetics), Auditory perception, Speech transmission, Linguistics, Sweden.

Perceptual confusions among Swedish consonants in VC and CV syllables are investigated. The stimuli were produced by splitting natural VCCV utterances in two halves at various points in time. The initial and final stimuli so obtained were used for two separate listening tests. The perceptual errors associated with the various VC and CV stimuli of any given VCCV utterance are analyzed with respect to the manner, place, and voicing features of the intervocalic consonant. Explanations of these errors in terms of acoustic and linguistic properties of the stimuli are attempted. (Author)
AD-654 074 Not available from CFSTI.

A PROGRAM FOR INTEGRATING THE WAVE EQUATIONS IN A CONTINUOUS IONOSPHERE, WITH COMPUTATION OF INITIAL CONDITIONS.
Interim rept.,
Navy Electronics Lab San Diego Calif
C. H. Sheddy. 1 Mar 67, 57p Rept no. NEL-672

Descriptors: (*Radio transmission, Differential equations), (*Ionospheric propagation, Mathematical analysis), Computer programs, Integration.

The differential equations which must be integrated to obtain full-wave solutions for radio propagation in a continuous ionosphere are given. A computer program integrates the equations using the reflection coefficient matrix as the dependent variable. The program is compared with an earlier version (DASA Report 1615) which uses an admit-

tance-matrix integration. The program computes its own initial conditions using an exact solution (for EW propagation) due to Crombie for a sharply bounded ionosphere. (Author)
AD-654 158 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATIONS OF TWO-DIMENSIONAL APERTURE CORRECTION OF TELEVISION CAMERA TUBES USING A VIDICON STORAGE UNIT.
Experimentelle Untersuchungen Zur Zweidimensionalen Aperturkorrektur Von Ferns- Ehauenahmerohren Mit Einem Vidikonspeicher
Royal Aircraft Establishment, Farnborough (England).
F. Arp. Jan 67, 36p RAE-LIB-TRANS-1204
Transl. Into English From German

Descriptors: *Aperture, *Television equipment, *Vidicon, Camera, Correction, Dimensional, Equipment, Picture, Signal, Storage, Television, Tube, Two, Unit.

For abstract, see STAR 05 15.
N67-27796 HC$3.00 MF$0.65

QUARTERLY RADIO NOISE DATA FOR DECEMBER, JANUARY, FEBRUARY 1965-66.
Technical rept.,
Institutes for Environmental Research, Boulder, Colo.
W. Q. Crichlow, R. T. Disney, and M. A. Jenkins.
Mar 67, 52p ITSA-18-29
IER-18

Descriptors: (*Noise (Radio), *Networks), Antennas, Time, Atmospherics, Radio interference, Voltage, Measurement, Recording systems, Bandwidth, Radio relay stations, Periodic variations, Maps, Tables.

A number of radio noise recording stations are operated in a program co-ordinated by the Environmental Scier.ce Services Administration. Measurement results are given as month-hour and time block median and decile values. The parameters recorded are the noise power expressed in terms of an effective antenna noise factor, fa, and the mean voltage and mean logarithm expressed as deviations, Vd, and Ld, in dB below the average power. No systematic statistical editing of the records has been attempted in this publication. The data should be used, realizing the values given may reflect levels of atmospheric noise, man-made noise, or station interference. These quarterly summaries of radio noise formerly were published as NBS Technical Notes. (Author)
PB-174 841 HC$3.00 MF$0.65

SPEEDING-UP OF HF RADIOTRANSMISSIONS AND BROADCASTS (WORLD WEATHER WATCH STUDY T.21).
Technical rept.
Institutes for Environmental Research, Boulder, Colo.
Hiroshi Akima. Mar 67, 99p ITSA-34
IER-34

Descriptors: (*Radio transmission, *High frequency), (*Global communications systems, High frequency), Data transmission systems, Atmospherics, Periodic variations, Effectiveness, Noise, Extraterrestrial radio waves, Weather.

Technical problems arising from the use of HF radio circuits for the global telecommunication system in the World Weather Watch (WWW) plan are reviewed. Propagation factors affecting HF communications are delineated, modulation-demodulation techniques as well as error control procedures to be used for HF high-speed data transmission are reviewed and consolidated, and technical problems concerning HF meteorological broadcasts are discussed. Several technical recommendations for the design of the WWW global telecommunication system are made, based on these studies. (Author)
PB-174 842 HC$3.00 MF$0.65

17E. INFRARED AND ULTRAVIOLET DETECTION

FEASIBILITY OF USING FLUORESCENT COLORANTS TO AFFORD CAMOUFLAGE PROTECTION AGAINST PHOTOGRAPHIC DETECTION,
Army Natick Labs Mass Clothing and Organic Materials Div
For primary bibliographic entry see Field 11C.
AD-653 604 HC$3.00 MF$0.65

AIRBORNE ELECTRONIC ULTRA-FAST SCANNING SPECTROMETER,
Utah State Univ Logan Electro-Dynamics Labs
D. J. Baker, and A. J. Steed. 1 Mar 67, 29p Rept no. Scientific-1
AFCRL-67-0220
Contract AF 19 (628)-4994
Research sponsored in part by DASA.

Descriptors: (*Spectrometers, Scanning), Airborne, Electronic scanners, Photomultipliers, Magnetic recording systems, Spectrophotometers, Infrared detectors.

An all-electronic scanning spectrometer is described which is capable of scanning the 0.6 to 1 micron spectral region at scan rates of up to 10,200 scans/second at a resolution of better than 15 A. An image dissector photoelectron multiplier tube is used as the detection device. The minimum detectable signal of the system is less than 0.000001/sq cm/A at 0.8 microns. The instrument occupies a volume of less than half a cubic foot and is designed for operation in a KC-135 aircraft. Video magnetic tape recording is used, and a digital readout method has been developed so that the data can be programmed into a computer. (Author)
AD-653 997 HC$3.00 MF$0.65

A STUDY OF ADVANCED INFRARED DETECTORS FOR USE IN PLANETARY SPECTROSCOPY SEMIANNUAL REPORT, 1 OCT. 1966 - 31 MAR. 1967.
California Univ., Berkeley. Space Sciences Lab.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 15.
N67-28784 HC$3.00 MF$0.65

17G. NAVIGATION AND GUIDANCE

PORTABLE DEPTH ECHO SOUNDING TESTS-MODIFIED RAYTHEON DE-723B FATHOMETER WITH A NARROW BEAM TRANSDUCER.
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 13J.
AD-653 445 HC$3.00 MF$0.65

EMPIRICAL HUMAN-FACTORS INVESTIGATION OF DISPLAY DESIGN.
Final rept.,
Franklin Inst Research Labs Philadelphia Pa
Clifton E. Mayfield. Apr 67, 71p
FAA-RD-67-12
Contract FAA/BRD-423

Descriptors: (*Instrument panels, Display systems), (*Air traffic control systems, Human engineering), Air traffic, Simulation, Altitude, Air traffic controllers, Targets.
Identifiers: Alpha-numeric symbols.

The report discusses two experiments in which alphanumeric formats for aircraft flight information are compared. Both experiments utilized a nonintervention dynamic simulation of air traffic which has been called 'microsimulation.' The first experiment, performed with low traffic densities, indicated that altitude and climb-descent information could suitably be placed in tabular format if arranged in order of beacon altitude. In this experiment the target-associated identification always remained in the same position with respect to the target. In the second experiment, a tabular format similar to that of Experiment I was compared with a full three-line target-associated tag which was flipped to a new position (relative to the target) whenever overwrites were imminent. The only significant differences were related to the variances of conflictions called by the controller subjects, with the tag format yielding larger variabilities than the tabular format. It is suggested that since this tends to cause unnecessary control actions, the tabular format is at least not inferior to the tag format when traffic densities are high as in this experiment. (Author)
AD-653 470 HC$3.00 MF$0.65

JAMESTOWN VOR LOCALIZER (VORLOC).
Interim rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Frederick W. Marschall. Nov 66, 34p
FAA-RD-66-90

Descriptors: (*Radio navigation, *Landing aids), Radio equipment, Very high frequency, Performance (Engineering), Guidance, Radio homing.

A low cost system called VORLOC was designed to be used in a manner similar to a standard localizer but operates on VOR frequencies with the standard VOR receiver and instrumentation. The equipment was subjected to severe siting conditions to examine the degree to which course quality would be derogated. Jamestown, New York was selected as a typical small airport with reasonably difficult terrain features. The results of the tests performed at Jamestown were comparable to those obtained at NAFEC. The course line had course path bend amplitude of 0.46 degrees on a 95% probability basis with extremes of 0.23 and 0.90 degrees. Both front and back courses had a range of more than 25 miles at an altitude of 1,500 feet. The characteristics of the VOR TO-FROM Indicator reversed sensing outside plus or minus 30 degrees of arc (approximately) from the on-course line were observed; however, the operational significance of this flag behavior was not established. (Author)
AD-653 719 HC$3.00 MF$0.65

A MATHEMATICAL ANALYSIS OF THE PERFORMANCE OF THE ATC RADAR BEACON SYSTEM,
Airborne Instruments Lab Deer Park N Y
A. Ashley. Aug 59, 258p Rept no. AIL-5791-12
Contract FAA/BRD-16
Original contains color reproduced in B/W only after original supply is exhausted.

Descriptors: (*Air traffic control systems, Radar beacons), (*Radar beacons, Performance (Engineering)), Mathematical analysis, Mathematical models, Transponders, Circuits.

A mathematical model representing the current New York environment affecting the capacity of the Air Traffic Control Radar Beacon System was developed for 21 stations to evaluate the effects upon system performance when (1) changes are made in system parameters and (2) various combinations of system improvements are incorporated. The combined effect of all stations on the reply rate from any aircraft in the area is calculated as well as the aircraft information available for display and utilization at the Idlewild enroute beacon station. To indicate the optimum future configurations, the computations are performed for combinations of (1) the basic system and three different

sidelobe suppression techniques, (2) receiver subtraction, (3) single and double defruiting, and (4) several decoder settings. Various settings of dead-time, suppress-time, and reply-limit are imposed on each of the combined systems. An interrogation-channel analysis for a 60-station mathematical model is also presented. Additional discussion and analysis is given to anti-cross-moding effects, low-cost transponders, monopulse techniques, and echo-suppression circuitry. (Author)
AD-653 797 HC$3.00 MF$0.65

OPTIMIZATION OF DOPPLER DAMPING OF INERTIAL NAVIGATION SYSTEMS.
Phase rept.,
Naval Air Development Center Johnsville Pa Aero Mechanics Dept
Steven R. Ellms. 22 Dec 66, 29p Rept no. NADC-AM-6657

Descriptors: (*Inertial navigation, *Doppler navigation), Doppler systems, Damping, Errors, Optimization.

A theoretical analysis was performed to determine the optimal gains for a linear velocity-damped second order inertial navigation system. Experimental data was collected by utilizing the theoretically optimum gains in a typical inertial system. The theoretical analysis was verified by experimental results. (Author)
AD-653 865 HC$3.00 MF$0.65

IMPROVED EQUIPMENT ARRANGEMENTS FOR TRACON ROOMS.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
J. Roy Bradley, Jr. Apr 66, 85p
FAA-RD-66-22
Original contains color reproducible in black and white only after original supply is exhausted.

Descriptors: (*Air traffic control terminal areas, Human engineering), (*Radar equipment, Human engineering), Display systems, Design, Lighting equipment, Configuration.

The report presents the results of a research project conducted to recommend environmental and hardware improvements for Terminal Radar Control (TRACON) Rooms. Through the use of laboratory techniques a simulated TRACON room was established to test environmental concepts and equipments. Field controllers' opinions and recommendations, with those of the project members, were used as a basis for determining the advantages or disadvantages of particular equipments, their locations, and console modifications and configurations. Recommendations include: Operating position arrangement concepts; placement of auxiliary equipment and controls; improved lighting techniques and information display devices; and a new design for ATC TRACON room consoles. (Author)
AD-653 871 HC$3.00 MF$0.65

THE SOLUTION OF THE EULERIAN GYROSCOPE EQUATIONS BY MEANS OF LIE SERIES MAKING USE OF RECURRENCE FORMULAS.
Innsbruck Univ. (Austria). Inst. of Theoretical Physics.
For primary bibliographic entry see Field 12A.
For abstract, see STAR 05 15.
N67-28009 HC$3.00 MF$0.65

AVIONICS REQUIREMENTS FOR ALL WEATHER LANDING OF ADVANCED S S T'S. VOLUME I - ANALYSIS OF SYSTEM CONCEPTS AND OPERATIONAL PROBLEMS FINAL REPORT.
Sperry Phoenix Co., Ariz.
For primary bibliographic entry see Field 1B.
For abstract, see STAR 05 15.
N67-28753 HC$3.00 MF$0.65

AVIONICS REQUIREMENTS FOR ALL WEATHER LANDING OF ADVANCED S S T'S. VOLUME III - SPECIFIC PROBLEMS OF AN SST AND RELATED TECHNOLOGICAL TRENDS FINAL REPORT.
Sperry Phoenix Co., Ariz.
For primary bibliographic entry see Field 1B.
For abstract, see STAR 05 15.
N67-28794 HC$3.00 MF$0.65

THE EFFECTS OF TRACKING STATION LOCATION UNCERTAINTY AND MEASUREMENT BIAS ERRORS DURING PHASES OF THE APOLLO MISSION.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 9F.
For abstract, see STAR 05 15.
N67-28823 HC$3.00 MF$0.65

ACCURATE GUIDANCE WITH LARGE OPTICAL EQUIPMENT.
California Inst. of Tech., Pasadena.
B. H. Rule. 1967, 19p NASA-CR-84834, SSS-67-78

Descriptors: *Astronomical telescope, *Performance characteristics, Accuracy, Astronomical, Base, Characteristics, Criterion, Ground, Instrument, Observatory, Optics, Optimization, Performance, Review, Space, Technique, Telescope, Tracking.

For abstract, see STAR 05 15.
N67-28839 HC$3.00 MF$0.65

SPACE PROBE RADAR ALTIMETER STUDY FINAL TECHNICAL REPORT, VOLUME I, MAR. - DEC. 1966.
Texas Instruments, Inc., Dallas. Apparatus Div.
Dec 66, 136p NASA-CR-66383
Contract NAS1-5954

Descriptors: *Mars probe, *Radar altimeter, *Solid state device, Altimeter, Antenna, Continuous, Design, Device, Frequency, Interruption, Mars (planet), Modulation, Probe, Pulse, Radar, Solid, State, Sterilization, Wave, X-band.

For abstract, see STAR 05 15.
N67-28931 HC$3.00 MF$0.65

DEVELOPMENTAL PLAN FOR THE DESIGN, DEVELOPMENT, AND PRODUCTION OF A SPACE PROBE ALTIMETER FINAL TECHNICAL REPORT, VOLUME 2, MAR. - DEC. 1966.
Texas Instruments, Inc., Dallas. Apparatus Div.
Dec 66, 46p NASA-CR-66384
Contract NAS1-5954

Descriptors: *Management planning, *Mars probe, *Product development, *Radar altimeter, Altimeter, Cost, Design, Development, Environment, Estimate, Facility, Flight, Management, Manufacturing, Mars (planet), Planning, Probe, Product, Production, Program, Radar, Solid, State, Test.

For abstract, see STAR 05 15.
N67-28932 HC$3.00 MF$0.65

17H. OPTICAL DETECTION

LIMITATIONS FOR DAYTIME DETECTION OF STARS USING THE INTENSIFIER IMAGE ORTHICON,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 402 Not available from CFSTI.

OPTICAL RADAR AND PASSIVE OPTO-ELECTRONIC RANGING,
Wright Air Development Div Wright-Patterson AFB Ohio
Radames K. H. Gebel. 8 Feb 65, 13p
Availability: Published in The Ohio Journal of Science v66 n5 p496-507 Sep 1966.

Descriptors: (*OPDAR, *Optical equipment), Range finding, Electronic equipment, Signal-to-noise ratio, Images, Resolution, Light, Sensitivity, Circuits, Geometry, Design.

The purpose of this paper is to present the fundamental technical arrangement involved for optical radar, its resolution, and requirements concerning the light source for use with it. Some basic optical radar problems are explained and pertinent equations are derived. The paper shows that 10 to the 17th power quanta per pulse at a repetition rate of 77 per second are sufficient to achieve optical radar. If a source can produce the necessary quanta flux with a bandwidth of not more than about 20 A, the job will be as well performed by this source as by a laser. Very promising luminescent semiconductors for such an endeavor, using the visible spectrum, seem to be the II-VI compounds. An automatic passive optical range-finder system using a special pick-up transducer (conceived by the author) which automatically suppresses any background structure (clouds, etc.) is explained. (Author)
AD-653 403 Not available from CFSTI.

CONTRIBUTION TO THE INVESTIGATION OF DYNAMIC ERRORS OF THE AXES OF ROTATION OF A CINE- THEODOLITE.
Beitrag Zur Ermittelung Der Dynamischen Drehachsenfehler Eines Kinotheodolits
Royal Aircraft Establishment, Farnborough (England).
H. E. Hoffmann. Oct 66, 87p RAE-L1B-TRANS-1190
Transl. Into English From German

Descriptors: *Cinetheodolite, *Instrument error, *Rotation, Accuracy, Axis, Dynamic, Equipment, Error, Horizontal, Instrument, Measurement, Test, Vertical.

For abstract, see STAR 05 15.
N67-27794 HC$3.00 MF$0.65

SPECTRAL TRANSMISSION OF TWO OPTICAL SYSTEMS.
Royal Aircraft Establishment, Farnborough (England).
A. E. Smith. Jan 67, 21p RAE-TR-67010

Descriptors: *Calibration, *Monochromatic radiation, *Optical instrument, *Star tracking, Accuracy, Filter, Instrument, Light, Monochromatic, Optical, Photomultiplier, Radiation, Spectral, Star, Telescope, Tracking, Transmission.

For abstract, see STAR 05 15.
N67-27800 HC$3.00 MF$0.65

17I. RADAR DETECTION

RADAR AMBIGUITY ANALYSIS.
Technical note,
Royal Radar Establishment Malvern (England)
P. M. Woodward. Feb 67, 39p Rept no. RRE-TN-731

Descriptors: (*Radar signals, Mathematical analysis), Statistical functions, Great Britain, Modulation, Functions.
Identifiers: Ambiguity functions.

Methods are given for obtaining the ambiguity characteristics of various types of high-resolution radar waveform, amplitude or phase modulated, pulsed or CW. The analysis deals mainly with random modulations, to which many complicated types of waveform approximate. (Author)
AD-653 404 HC$3.00 MF$0.65

NRL TERRAIN CLUTTER STUDY, PHASE I.
Interim rept.,
Naval Research Lab Washington D C
N. W. Guinard, J. T. Ransone, Jr., and M. B. Laing. 10 May 67, 85p Rept no. NRL-6487

Descriptors: (*Radar clutter, Terrain), Scientific research, Detection, Surface properties, Background, Noise, Calibration, Power spectra, Errors, Signal generators, Time, Phase studies, Backscattering, Radar signals, Frequency, Rayleigh scattering, Data processing systems.

The first phase of a terrain-clutter study has been completed at NRL, utilizing the four-frequency radar system installed in a WV2-128324 (Super Constellation) aircraft. This system is capable of transmitting and receiving four frequencies (P, L, C, and X) consecutively with a choice of horizontal, vertical, and alternating polarizations. The returns are gated at a fixed range and analyzed in a digital computer. Absolute clutter measurements have taken over both Canadian and American sites at angles of incidence of 10 degrees or less. Two parameters have been measured. The first is the normalized radar cross section in terms of the 10, 50 (median), and 90 percentile values of its distribution, while the second is the fluctuation power spectrum of the coherent radar return signal. Two types of statistical processes have been determined from the cross-section data; one follows a Rayleigh distribution between 10 and 90 percentile values, and one departs radically from this distribution. The energy in the fluctuation power spectrum has been estimated in frequency bands whose spacing is determined by the transmitted frequency, e. g., 2 cps at P band through 10 cps at X band. The root mean square deviations of the estimates indicate likewise a Rayleigh behavior for certain bands and a radical departure from this behavior. In this case, the radical departure is identified as a Ricean (signal plus noise) distribution produced by strongly reflecting point targets in the illuminated area. A statistical model for terrain clutter is proposed which will enable the phenomenon disclosed by the study to be simulated based upon the optical analysis of Synthetic Aperture Radar Maps. (Author)
AD-653 447 HC$3.00 MF$0.65

RADAR WARNING SYSTEM,
Foreign Technology Div Wright-Patterson AFB Ohio
Yin Jui. 14 Mar 67, 11p Rept no. FTD-HT-66-164
TT-67-62092
Edited trans. of Hang K'ung Chih Shih (Chinese People's Republic) n12 p9-11 1964.

Descriptors: (*Radar tracking, *Aircraft defense systems), Radar equipment, Air-to-air, Search radar, Guided missiles, High-speed bombing, Early warning systems, Fire control system comts, Aircraft, Time, China.

Since the rapid development of the electronics industry after World War II, radar has been used to perform various missions in the Air-Defense System. For low speed aircraft, radar systems can be divided into early warning radar, ground fire-control radar, etc. Today, however, the speed of aerial attacks is greatly increased in ballistic missiles and supersonic aircraft. The time allowed to compute defense data is therefore greatly reduced, and the old defense systems are no longer capable of handling a high-speed air attack. For meeting the challenge of ICBM attack, the defense system must be modified. One approach is to increase the effective radar distance, and to automate the calculation of all data and its delivery to the defensive missile site. Newly developed radar units such as ground-to-air missile-guiding radar, air-to-air missile-guiding radar, and guided missile search radar have been extensively developed. The author points out, in conclusion, that an air defense system must be constantly changing to meet the requirements of newly developed techniques of aviation. (Author)
AD-653 503 HC$3.00 MF$0.65

THE PERFORMANCE OF SEVERAL INCOHERENT SEQUENTIAL DETECTORS,
Rand Corp Santa Monica Calif
L. H. Wegner. Apr 67, 73p Rept no. RM-5318-PR
Contract F44620-67-C-0045

Descriptors: (*Radar equipment, Performance (Engineering)), Detectors, Tests, Probability, Targets, Signal-to-noise ratio, Integral equations.

An evaluation of the performance of several sequential detectors for the case of incoherent detection; that is, when the pulse-to-pulse radar returns are independent observations on the envelope of a sine wave in narrow-band Gaussian noise. Two sequential probability ratio tests (SPRTs) and the biased square law sequential detector (BSLSD) were compared for blip/scan ratio and average test time for static and fluctuating targets at known range. The SPRT for Swerling's Model II fluctuating target is the preferred sequential test; it gives a 4 to 7 db improvement over the optimum fixed-duration tests. Wald's approximations for SPRT evaluation were compared with the exact results and found to be inadequate for large signal/noise ratios. The APRST and MPRST (averaged and maximum probability ratio sequential tests) were evaluated and compared with optimum fixed-duration tests for unknown range conditions (multiple range resolution cells). (Author)
AD-653 514 HC$3.00 MF$0.65

INTEGRATED CIRCUITS FOR PORTABLE RADAR EQUIPMENT.
Texas Instruments Inc Dallas Semiconductor-Components Div
For primary bibliographic entry see Field 9E.
AD-653 628 HC$3.00 MF$0.65

DUPLEXER FOR SIDE-LOOKING RADAR.
Litton Precision Products Inc Morris Plains N J Airtron Div
For primary bibliographic entry see Field 9E.
AD-653 781 HC$3.00 MF$0.65

DUPLEXER FOR SIDE-LOOKING RADAR.
Litton Precision Products Inc Morris Plains N J Airtron Div
For primary bibliographic entry see Field 9E.
AD-653 782 HC$3.00 MF$0.65

THE OVERALL FALSE ALARM PROBABILITY FOR A RADAR SEARCHING OVER A WIDE INTERVAL OF RANGE.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
P. W. James. Dec 66, 36p Rept no. TR-66405

Descriptors: (*Search radar, *Target acquisition), Great Britain, Errors, Probability, Radar reflections, Attenuation.

The overall false alarm probability is calculated taking into account the variation of target strength with range. It is assumed that the two types of error probabilities are arranged to be in constant ratio for targets at all ranges. Both slow-fading and fast-fading targets are considered. (Author)
AD-654 033 HC$3.00 MF$0.65

APPLICATION OF RADAR TO MEASUREMENT OF SURFACE PRECIPITATION.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 4B.
AD-654 127 HC$3.00 MF$0.65

DESIGN OF INTEGRATED ELECTRONIC D/A CONVERTER FOR DRIVING CRT DISPLAY OF ELECTRONIC SCANNER RADAR.
Technical rept.,
Army Electronics Command Fort Monmouth N. J.
George A. Hrivnak, and Edmund Malecki. Mar 67, 17p Rept no. ECOM-2822

Descriptors: (*Digital-to-analog converters, *Radar equipment), Radar scanning, Display systems, Scanning, Phased arrays, Electrical networks, Deflection, Voltage.

The use of a phased array to perform electronic beam steering in a radar set can result in significant power reduction and improved camouflage capability through the use of digitally controlled, reciprocal latching phase shifters. This report deals with the design of an integrated D/A converter which will provide deflection voltage to the CRT display of the electronic scanner radar set as a function of the digital steering information. (Author)
AD-654 131 HC$3.00 MF$0.65

A NEW CLUTTER MODEL WHICH ACCOUNTS FOR CLUTTER CORRELATION AND ITS APPLICATION TO RADAR DESIGN,
Army Missile Command Redstone Arsenal Ala Advanced Systems Lab
Robert C. Ward. 1 Jun 67, 143p Rept no. RE-TR-67-1

Descriptors: (*Radar clutter, Mathematical models), Design, Radar equipment, Doppler radar, Probability, Target acquisition.

The report analyzes current radar clutter models and examines the criteria by which they are applied in the prediction of radar clutter performance. The fundamentals of radar detection theory are reviewed in order to devise a more appropriate clutter model. The principal criterion in current use, the average probability of clutter false alarm, is not always adequate in predicting radar clutter performance. Furthermore, the generally accepted methods of determining the average probability of clutter false alarm can be improved. A new clutter model is synthesized, from the current average-probability-of-clutter-false-alarm criterion (properly calculated), and from new, more relevant criteria based on the detection and tracking performance of a radar system. The spatial correlation of large radar clutter returns determines the probability that clutter false alarms will occur in adjacent clutter patches, creating 'dark zones' which preclude target detection. The size and shape of the dark zone will also determine whether tracking can be performed. The probabilities of various classes of dark zones versus the value of radar reflection coefficient which will cause a clutter false alarm are determined from empirical clutter data, and are used to illustrate a new clutter model application. (Author)
AD-654 137 HC$3.00 MF$0.65

AN INTEGRAL EQUATION EIGENFUNCTION PROBLEM CONCERNING THE ABILITY OF A RADAR TO DISTINGUISH BETWEEN TWO TARGETS.
Royal Aircraft Establishment, Farnborough (England).
R. P. Muddle. Nov 66, 18p RAE-TR-66348

Descriptors: *Eigenfunction, *Integral equation, *Numerical analysis, *Radar target, Analysis, Computer, Discrimination, Eigenvalue, Equation.

Integral, Numerical, Program, Radar, Signal, Target.

For abstract, see STAR 05 15.
N67-28807 HC$3.00 MF$0.65

RADAR OBSERVATIONS OF A TORNADO THUNDERSTORM IN VERTICAL SECTION,
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass. Geophysics Research Directorate.
For primary bibliographic entry see Field 4B.
PB-174 859 HC$3.00 MF$0.65

THUNDERSTORM CIRCULATIONS AND TURBULENCE STUDIES FROM AIRCRAFT AND RADAR DATA.
National Severe Storms Lab., Norman, Okla.
For primary bibliographic entry see Field 4B.
PB-174 860 HC$3.00 MF$0.65

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. FUSION DEVICES (THERMONUCLEAR)

A REVIEW OF DISPERSION RELATIONS FOR LOW FREQUENCY WAVES IN QUIESCENT MAGNETO PLASMAS,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-653 589 HC$3.00 MF$0.65

CROWBAR CODE.
Los Alamos Scientific Lab., N. Mex.
D. A. Baker, and L. W. Mann. Jul 66, 61p
Contract W-7405-eng-36

Descriptors: (*Thermonuclear reactions, Programming languages), Magnetic fields, Coding, Capacitors, Energy, Storage, Input-output devices, Coding, Wiring diagrams.

For abstract, see NSA 21 13.
LA-3548 HC$3.00 MF$0.65

18B. ISOTOPES

SUMMARY OF PUBLISHED MEASUREMENTS FROM THE ATOMIC BEAM GROUP AT THE UNIVERSITY OF CALIFORNIA FROM APRIL 1962 TO MAY 1964,
California Univ Berkeley
Howard A. Shugart. 1964, 6p
AFOSR-67-0661
Grant AF-AFOSR-62-346
Prepared in cooperation with Lawrence Radiation Lab., Berkeley, Calif.
Availability: Published in Brookhaven Conference on Molecular Beams and Atomic Resonance (7th), Uppsala Univ. (Sweden) Jun 22-Jul 2 1964.

Descriptors: (*Isotopes, Nuclear properties), (*Molecular beams, Experimental data), Tables, Half life, Atomic energy levels, Spectroscopy, Nuclear spins.

The nuclear properties of isotopes investigated during the 26-month period beginning April 1962 by the Atomic Beam Group at Berkeley are listed. Also included, for completeness, are earlier measurements on properties such as half-life, spin, electronic ground state, and so on. (Author)
AD-653 681 Not available from CFSTI.

CALCULATION OF PARTICLE-HOLE STATES IN THE 2s-1d SHELL,
Michigan Univ Ann Arbor Dept of Physics
For primary bibliographic entry see Field 20H.
AD-653 978 HC$3.00 MF$0.65

PROMETHIUM ISOTOPIC POWER DATA SHEETS,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
H. T. Fullam, and H. H. Van Tuyl. Feb 67, 18p
Contract AT (45-1)-1830

Descriptors: (*Promethium, *Radioactive isotopes), Preparation, Half life, Shielding, Nuclear propulsion, Power reactors.

For abstract, see NSA 21 13.
BNWL-363 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

DESIGN AND FABRICATION OF A PHOTOTYPE LAMINATED URANIUM METAL SHIPPING CASK FOR LARGE SHIPMENTS OF CO,
Paducah Gaseous Diffusion Plant, Ky.
primary bibliographic entry see Field 6R.
For abstract, see NSA 21 13.
KY-521 HC$3.00 MF$0.65

A SEDIMENT POROSITY METER A FEASIBILITY STUDY,
Lane-Wells Co., Houston, Tex.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
ORO-3325-1 HC$3.00 MF$0.65

18C. NUCLEAR EXPLOSIONS

DEVELOPMENT OF AN IMPROVED LAND-SURFACE FALLOUT MODEL. PART II. ATMOSPHERIC TRANSPORT.
Final rept., 31 Mar 65-31 Jan 67,
Technical Operations Inc Burlington Mass
T. W. Schwenke, I. Kohlberg, H. G. Norment, and W. Y. G. Ing. Feb 67, 320p Rept no. TO-B-66-80
ECOM-01309-F
Contract DA-28-043-AMC-01309 (E)
See also Part 1, AD-643 534.

Descriptors: (*Radioactive fallout, *Nuclear weapons), (*Models (Simulations), *Nuclear explosions), Wind, Atmospheric motion, Computer programs, Mathematical prediction, Department of Defense, Terrain, Modules (Electronics), Programming (Computers), Flow charting, Particles, Diffusion, Velocity, Transport properties.

A collection of models developed to simulate atmospheric transport of local fallout from nuclear detonations is described. These models comprise the Transport Module of the Department of Defense Land Fallout Prediction System (acronym DELFIC). Details of the physical bases of the models as well as the Transport Module computer programs are presented. The programs provide for temporal and three-dimensional spatial variation of the wind field. Wind-field construction from input data can be accomplished by one of several preprogrammed methods that may be selected on the basis of the type and quantity of available data. Submodels for special local circulation systems can be superposed on the macrowind system. A capability to simulate highly variable topography is included. The computer programs are essentially open ended with regard to capacity for particle, wind field, and topography data.
AD-653 633 HC$3.00 MF$0.65

ANALYSIS OF JAPANESE NUCLEAR CASUALTY DATA.
Final rept.,
Dikewood Corp Albuquerque N Mex
L. Wayne Davis, William L. Baker, and Donald L. Summers. Apr 66, 322p Rept no. DC-FR-1054
USNRDL-TRC-46
Contracts OCD-PS-64-196, N228 (62479)69778

Descriptors: (*Nuclear explosions, *Japan), (*Casualties, Japan), Nuclear explosion damage, Mortality rates, Nuclear radiation, Wounds + injuries, Population, Damage assessment, Structures, Damage, Urban areas, Concrete, Weapons, Shielding, Thermal radiation, Maps, Tables, Coding.

The report summarizes the results of a detailed data reduction and casualty study made on over 35,000 persons who were subjected to the nuclear attack on Hiroshima and Nagasaki, Japan, in 1945. Both graphical and tabular presentations are made of pertinent data to show that an excellent base exists for more reliable conclusions of a wider variety than have heretofore been available. Total mortality and total injury curves are given as well as injury curves by type (blast, thermal, and initial nuclear) for thirteen shielding categories, which includes a breakdown of seismic reinforced-concrete buildings by floor divisions. Further breakdowns of the blast and thermal injuries are also given here, but considerably greater detail will be presented in a follow-on effort directed towards predicting the medical load following a high-yield nuclear attack on the United States. The free-field weapons effects are presented for both Japanese cities to allow the association of a given effects level with a particular percent mortality or injury. (Author)
AD-653 922 HC$3.00 MF$0.65

TIME-OF-FLIGHT NEUTRON CROSS SECTION MEASUREMENTS USING NUCLEAR EXPLOSIONS. PART II,
Los Alamos Scientific Lab., N. Mex.
P. A. Seeger, and D. W. Bergen. 20 Dec 66, 39p
Contract W-7405-eng-36

Descriptors: (*Neutron cross sections, *Nuclear explosions), Errors, Foils, Signals, Isotopes, Density, Detectors, Scattering.

For abstract, see NSA 21 13.
LA-3478 HC$3.00 MF$0.65

SHORT TIME INTERVAL FREQUENCY MEASUREMENTS OF A CONTINUOUSLY CHANGING SINE WAVE,
California Univ., Livermore. Lawrence Radiation Lab.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
UCRL-50188 HC$3.00 MF$0.65

18D. NUCLEAR INSTRUMENTATION

STANDARDIZATION OF BETA COUNTING PROCEDURES USED AT NRL IN THE RADIOCHEMICAL ANALYSIS OF AIR FILTER SAMPLES.
Memorandum rept.,
Naval Research Lab Washington D C
A. W. Saunders, Jr., R. L. Patterson, Jr., and L. B. Lockhart, Jr. May 67, 32p Rept no. NRL-MR-1764

Descriptors: (*Radiochemistry, *Radiation measurement systems), (*Beta particles, Counting

methods), Radioactive fallout, Fission products, Gas filters, Calibration, Radioactivity, Instrumentation, Standards, Beta-ray spectrum, Geiger counters.

The calibration of beta counting systems used for the quantitative determination of radionuclides in air filter collections is described. Solid calibration standards are prepared from a variety of standardized sources of radioisotopes of different beta energies by mounting in a reproducible geometry 50.0- and 25.0-mg quantities of carrier material containing known amounts of radioactivity. A calibration curve of counting efficiency vs. beta-max energy is constructed for each counting system, from which the counting efficiency of a wide variety of radionuclides having nonforbidden spectra can be derived. (Author)
AD-653 448 HC$3.00 MF$0.65

AIR PRESSURE DEPENDENCE OF COSMIC RAY INTENSITY. METHODS AND RESULTS OF A STATISTICAL ANALYSIS ON NEUTRON MONITOR DATA,
Uppsala Univ (Sweden) Cosmic Ray Group
Sten Martinelle. Nov 66, 30p Rept no. Scientific note-2
AFCRL-67-0212
Contract AF 61 (052)-868
See also AD-653 580.

Descriptors: (*Radiation monitors, *Neutron counters), (*Cosmic rays, Intensity), Sweden, Statistical analysis, Model theory, Time signals, Charged particles, Interactions, Barometric pressure.

A general regression model is derived which describes the dependence of the cosmic-ray neutronic component on the air pressure. As the residuals are correlated the ordinary least-squares method is not the best one to estimate the pressure effect. Alternative methods are discussed. Five methods are used to estimate the pressure coefficient at Upsala during the years 1957-1964. It turns out that a modified two-station method gives the best result and also that there exists a solar cycle dependence of the pressure coeff.
AD-653 579 HC$3.00 MF$0.65

A NEW METHOD OF COMPARING THE PERFORMANCE OF NEUTRON MONITORS,
Uppsala Univ (Sweden) Cosmic Ray Group
Sten Martinelle. Feb 67, 19p Rept no. Scientific note-3
AFCRL-67-0213
Contract AF 61 (052)-868
See also AD-653 579.

Descriptors: (*Radiation monitors, Performance (Engineering)), (*Neutron counters, *Cosmic rays), Sweden, Model theory, Factor analysis, Terrestrial magnetism, Least squares method, Sequences, Interpolation, Time signals.

A one-factor model is used to compare neutron monitor data from different stations. The method supplies information about the performance of the stations in a concise form allowing for differences in cut-off rigidities.
AD-653 580 HC$3.00 MF$0.65

PHYSICS DIVISION SUMMARY REPORT. ANNUAL REVIEW, APRIL 1, 1965-MARCH 31, 1966.
Argonne National Lab., Ill.
1966, 180p
Contract W-31-109-eng-38

Descriptors: (*Nuclear reactors, Nuclear physics), (*Particle accelerators, *Nuclear particles), Cyclotrons, Nuclear spectroscopy, Plasma physics.

For abstract, see NSA 21 13.
ANL-7246 HC$3.00 MF$0.65

ANNUAL REPORT FOR 1965 IN THE PHYSICAL SCIENCES. VOLUME 2. RADIOLOGICAL SCIENCES,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 21 13.
BNWL-235-2 HC$3.00 MF$0.65

INFRARED DETECTION OF NUCLEAR REACTOR COOLANT IMPURITIES,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
B. B. Brenden, W. J. Coleman, and G. E. Moore.
Feb 67, 16p
Contract AT (45-1)-1830

Descriptors: (*Reactor coolants, Impurities), (*Infrared detectors, Nuclear reactors), Radiation measurement systems, Instrumentation.

For abstract, see NSA 21 13.
BNWL-377 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

DESIGN AND OPERATION OF A SLOW NEUTRON CHOPPER,
Ames Lab., Iowa.
Roland George Struss. Mar 66, 48p
Contract W-7405-eng-82

Descriptors: (*Thermal neutrons, Laboratory equipment), (*Thermal column, *Nuclear particles), Design, Operation, Neutron beams, Velocity, Errors, Counting methods, Synchronization (Electronics).

For abstract, see NSA 21 13.
IS-1544 HC$3.00 MF$0.65

ELECTRONIC SCALE FOR MEASURING MASS FLOW,
Los Alamos Scientific Lab., N. Mex.
George N. Rupert. 20 Jan 67, 8p
Contract W-7405-eng-36

Descriptors: (*Balances, Electronic equipment), (*Gas flow, Flowmeters), Laboratory equipment, Synchros, Control systems, Electric switches, Voltage, Calibration.

For abstract, see NSA 21 13.
LA-3659 HC$3.00 MF$0.65

DECALIBRATION OF A TUNGSTEN-TUNGSTEN 25 PERCENT RHENIUM THERMOCOUPLE IN A NEUTRON FLUX,
Los Alamos Scientific Lab., N. Mex.
S. R. Skaggs, W. A. Ranken, and A. J. Patrick. Jan 67, 7p
Contract W-7405-eng-36

Descriptors: (*Thermocouples, *Neutron flux), (*Thermoelectricity, Nuclear radiation), Neutron Cross sections, Tungsten, Rhenium.

For abstract, see NSA 21 13.
LA-3662 HC$3.00 MF$0.65

ENVIRONMENTAL MONITORING REPORT JULY-DECEMBER 1966, AND 1966 SUMMARY,
Mound Lab., Miamisburg, Ohio.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 13.
MLM-1391 HC$3.00 MF$0.65

STUDY OF A HALPERN TYPE 4 PI NEUTRON DETECTOR.
Technical note,
National Bureau of Standards, Washington, D. C. Radiation Physics Div.
H. M. Gerstenberg, and E. G. Fuller. 12 Jun 67, 49p
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.30.

Descriptors: (*Neutron detectors, Efficiency), Neutrons, Bremsstrahlung, Geometry, Intensity, Energy, Photonuclear reactions, Absorption, Detectors, Response, Photons.

The response to various neutron spectra of a 2-inch diameter BF3 proportional counter in a Halpern-type geometry has been studied as a function of moderator thickness. Neutron sources used were a calibrated RaDBe (a,n) source and a series of photoneutron sources using a number of bremsstrahlung spectra. The reactions used were: 16PO (gamma,n), 31P (gamma,n) and d (gamma,n). For these sources absolute neutron yields were determined either from the residual B+ activity or from the known cross section and the absolute bremsstrahlung intensity. Using these empirical data a final detector with 13 BF3 counters was constructed. Over the spectral range covered by the above sources the measured efficiency for counting neutrons of the final detector was 9.6 percent with an estimated uncertainty of plus or minus 0.5 percent, independent of spectrum. The detector was used to measure the neutron yields from Pb, Au, Ta, Ho, Ag, Cu, Co, Ca, P, Al, O and C for a series of bremsstrahlung energies between 12.0 and 29.0 MeV. These yields were compared with those calculated from previously published neutron yield cross sections. The data indicate that previously reported discrepancies in neutron yield data can probably be traced to the determination of neutron detector efficiencies. (Author)
NBS-TN-416 HC$0.30 MF$0.65

LOW ENERGY BETA COUNTS AT THE RADIOACTIVITY MEASUREMENT LABORATORY OF GRENOBLE.
les Comptages Beta de Faibles Energies Effectues Au L. M. R.
Commissariat A L Energie Atomique, Grenoble (France). Centre D'etudes Nucleaires.
M. Chevalier, H. De Choudens, and A.-M. Duplaa. Nov 66, 37p CEA-R-3067
in French

Descriptors: *Radiation counter, *Scintillator, Beta, Biology, Compound, Counter, Gas, Labelling, Liquid, Low energy, Measurement, Quenching, Radiation, Radioactivity, Water.

For abstract, see STAR 05 15.
N67-27918 HC$3.00 MF$0.65

GAS DETECTORS FOR THERMAL NEUTRON AT HIGH COUNTING RATES.
Etude des Detecteurs A Gaz pour Neutrons Thermiques Fonctionnant en Collection de Courant
Commissariat A L Energie Atomique, Fontenay-Aux-roses (France). Centre D'etudes Nucleaires.
V. Q. Mai. 1966, 133p CEA-R-2962
in French

Descriptors: *Detector, *Proportional counter, *Thermal neutron, Channel, Circuit, Counter, Current, Cylinder, Electronic, Formation, Gas, Neutron, Nuclear, Proportion, Pulse, Reactor, Shape, Theory, Thermal.

For abstract, see STAR 05 15.
N67-27919 HC$3.00 MF$0.65

A SEDIMENT POROSITY METER A FEASIBILITY STUDY,
Lane-Wells Co., Houston, Tex.
Billy F. Wilson, and Arthur H. Youmans. Jun 66, 72p
Contract AT (40-1)-3325

Descriptors: (*Sedimentation, Porosity), Feasibility studies, Meters, Electronics, Gamma rays, Detectors, Instrumentation, Scientific research.

For abstract, see NSA 21 13.
ORO-3325-1 HC$3.00 MF$0.65

SHORT TIME INTERVAL FREQUENCY MEASUREMENTS OF A CONTINUOUSLY CHANGING SINE WAVE,
California Univ., Livermore. Lawrence Radiation Lab.
R. E. Mards. 27 Feb 67, 11p
Contract W-7405-eng-48

Descriptors: (*Modules (Electronics), *Computer logic), (*Time-interval counters, *Input-output devices), Data storage systems, Magnetic cores.

For abstract, see NSA 21 13.
UCRL-50188 HC$3.00 MF$0.65

18E. NUCLEAR POWER PLANTS

RESEARCH PROGRAM FOR THE GARIGLIANO NUCLEAR POWER PLANT QUARTERLY REPORT, JAN. - MAR. 1966.
Ente Nazionale Per L Energia Elettrica (nel), Latina (Italy).
1 Apr 66, 8p EURAEC-1653, EUR-2851
Contract EURATOM-101-63-11-RD I

Descriptors: *Nuclear power plant, *Research project, Computer, Control, Data, Instrumentation, Nuclear, Operation, Oscillator, Performance, Plant, Power, Project, Research, Rod, System, Test.

For abstract, see STAR 05 15.
N67-28314 HC$3.00 MF$0.65

18F. RADIATION SHIELDING AND PROTECTION

A CRITICAL EVALUATION OF THE MARKOV MATRIX TREATMENT OF NEUTRON DIFFUSION IN SLABS.
Technical rept.,
Naval Civil Engineering Lab Port Hueneme Calif
M. L. Eaton, and C. M. Huddleston. May 67, 58p
Rept no. NCEL-TR-529

Descriptors: (*Shielding, Neutron transport theory), (*Neutron transport theory, *Matrix algebra), Fallout shelters, Albedo, Backscattering, Probability, Numerical analysis, Computer programs.
Identifiers: Markov matrix.

It is known that a method based on the concept of a Markov chain can be used to treat the problem of absorption, transmission, and backscatter when single-velocity neutrons are incident on a plane slab of finite thickness, under the assumption that scattering is isotropic in the laboratory system (see AD-640 260). Such conditions can exist when neutrons impinge on a slab of material, such as a shield or an inside wall of a shelter entranceway. Since the Markov matrix method is a new approach to the problem, the practical limits in applying the method have not previously been explored. This report outlines the region of usefulness of the matrix method. The solutions to some sample problems are given. Comparisons are made with other theoretical treatments. It is concluded that the Markov matrix method is useful over a wide region of interest. Within its limits of practical applicability, the method gives highly exact answers without requiring exorbitant computing time. (Author)
AD-653 444 HC$3.00 MF$0.65

FEASIBILITY AND POTENTIAL EFFECTIVENESS OF PARTIAL-BODY SHIELDING FOR PERSONNEL PROTECTION AGAINST IONIZING RADIATION,
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 6R.
AD-653 459 HC$3.00 MF$0.65

ON THE SHIELDING OF THE EXTERNAL PROTON TUNNEL AREA OF ARGONNES ZERO GRADIENT SYNCHROTRON,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 20G.
For abstract, see NSA 21 13.
ANL-7273 HC$3.00 MF$0.65

REACTOR PHYSICS DEPARTMENT TECHNICAL ACTIVITIES QUARTERLY REPORT, JULY-SEPTEMBER 1966.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
BNWL-340 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

DESIGN AND FABRICATION OF A PHOTOTYPE LAMINATED URANIUM METAL SHIPPING CASK FOR LARGE SHIPMENTS OF CO,
Paducah Gaseous Diffusion Plant, Ky.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 13.
KY-521 HC$3.00 MF$0.65

QAD A DERIES OF POINT-KERNEL GENERAL-PURPOSE SHIELDING PROGRAMS,
Los Alamos Scientific Lab., N. Mex.
Richard E. Malenfnat. Oct 66, 195p
Contract W-7405-eng-36

Descriptors: (*Gamma rays, Computer programs), (*Neutrons, *Radiological dosage), Neutron flux, Programming (Computers), Input-output devices.

For abstract, see NSA 21 13.
LA-3573 HC$3.00 MF$0.65

18G. RADIOACTIVE WASTES

FIXATION OF RADIOACTIVE RESIDUES. RESEARCH AND DEVELOPMENT ACTIVITIES,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
A. M. Platt. Mar 67, 53p
Contract AT (30-1)-1830

Descriptors: (*Radioactive waste, Storage), Cesium, Ruthenium, Strontium, Radioactive isotopes, Transportation, Hazards.

For abstract, see NSA 21 13.
BNWL-365 HC$3.00 MF$0.65

DESIGN AND FABRICATION OF A PHOTOTYPE LAMINATED URANIUM METAL SHIPPING CASK FOR LARGE SHIPMENTS OF CO,
Paducah Gaseous Diffusion Plant, Ky.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 13.
KY-521 HC$3.00 MF$0.65

INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE-8.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
ORNL-NSIC-32 HC$3.00 MF$0.65

COMPREHENSIVE REPORT OF THE CLINCH RIVER STUDY,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 13.
ORNL-4035 HC$3.00 MF$0.65

BEHAVIOR OF IODINE IN AIR A RESUME OF THE FIRST SEVEN RUNS CONDUCTED AT THE NUCLEAR SAFETY PILOT PLANT,
Oak Ridge National Lab., Tenn.
J. L. Wantland, and T. H. Row. Apr 67, 115p
Contract W-7405-eng-26

Descriptors: ((*Reactor safety systems, *Fission products), (*Containment, *Neutron transport theory), Iodine, Reactor operation, Air, Sampling.

For abstract, see NSA 21 13.
ORNL-4050 HC$3.00 MF$0.65

18H. RADIOACTIVITY

STANDARDIZATION OF BETA COUNTING PROCEDURES USED AT NRL IN THE RADIOCHEMICAL ANALYSIS OF AIR FILTER SAMPLES.
Naval Research Lab Washington D C
For primary bibliographic entry see Field 18D.
AD-653 448 HC$3.00 MF$0.65

FALLOUT RADIATION EXPOSURE CONTROL (AN INTRODUCTION),
Office of Civil Defense Washington D C Postattack Research Div
Jack C. Greene. 1965, 53p

Descriptors: (*Radioactive fallout, *Control), Exposure, Fallout shelters, Contamination, Solubility, Radioactivity, Water supplies, Civil defense systems, Food, Intensity, Radioactive decay, Effectiveness, Physical properties, Tests, Protection.

The paper is intended for use by postattack research contractors and other interested persons as a summary statement on the problems of radiation exposure control with emphasis on the period after people emerge from shelter. This paper is the first of its kind on the subject and, for this reason, certain background material is included. An effort is made to identify and discuss problems in simple and direct language, and to relate to operational situations. Loss of precision that results thereby is not likely to change the implications and conclusions in any important way. References listed at the end of the paper contain the up-to-date scientific information on this subject; also, footnotes are used in some cases to provide supplemental information.
AD-653 475 HC$3.00 MF$0.65

RADIATION EFFECTS ON THIN-FILM INTEGRATED CIRCUIT ELEMENTS.
Quarterly rept., no. 2, 15 Jan 66-14 Apr 67,
North American Aviation Inc Anaheim Calif Autonetics Div
V. H. Strahan, A. J. Chesavage, and D. K. Nichols. Jun 67, 27p Rept no. 7. C7-420.1/501
ECOM-02431-2

Contract DA-28-043-AMC-02431 (E)
See also AD-651 144.

Descriptors: (*Radiation effects, *Integrated circuits), Microminiaturization (Electronics), Films, Nuclear radiation, Capacitors, Dielectric properties, Secondary emission, Compton scattering.

The efforts of this quarter were directed toward calculating and measuring FXR radiation induced charge in a thin aluminum film (3810 A) deposited on a 0.032 inch insulating substrate. The relative importance of the mechanisms for inducing a charge and the influence of a bias voltage on the conductor were analyzed. The net charge change on the sample is the difference between the deposition and the emission in the sample of Compton electrons and secondary electrons. The net charge change from secondary electrons is approximately twice that from Compton electrons. A bias voltage in excess of plus or minus 60 volts on the thin-film conductor controls the net charge changes from secondary electrons but does not influence the Compton electrons. The geometry of the experiment affects the electron to gamma ratio of the incident beam which results in a value for the net charge change applicable to the specific experiment only.
AD-653 623 HC$3.00 MF$0.65

DEVELOPMENT OF AN IMPROVED LAND-SURFACE FALLOUT MODEL. PART II. ATMOSPHERIC TRANSPORT.
Technical Operations Inc Burlington Mass
For primary bibliographic entry see Field 18C.
AD-653 633 HC$3.00 MF$0.65

RESEARCH STUDY OF A CO2 LASER RADAR TRANSMITTER.
Semiannual technical summary rept., 1 Nov 66-1 May 67,
Raytheon Co Waltham Mass Research Div
Perry A. Miles, and Frank A. Horrigan. Jun 67, 55p Rept no. S-970
Contract N00014-67-C-0264, ARPA Order-306

Descriptors: (*Gas lasers, Opdar), (*Opdar, *Radar transmitters), Carbon dioxide, Nitrogen, Helium, Excitation, Pumping (Optical), Amplifiers, Optical equipment, Gas discharges, Electromagnetic pulses, Molecular energy levels, Electron transitions, Gain.

The report concerns the investigation of physical properties of laser amplifiers, using electrically excited mixtures of CO2, N2, and He with a view to producing high-power pulse emission with well-controlled temporal and spatial form. The object of this investigation is to design and build such a source with an average power of 1 kW in a form suitable for use as a laser radar transmitter. Designs have been developed for both dc- and pulse-excited amplifiers and the physical quantities of importance in these designs have been measured. The most notable of these are: the s gnal intensity required to drive an amplifier to saturation, information on the refractive properties of the discharge, the time constant determining maximum pulse repetition rates, both for the input pulse trace and for the pulse excitation process, and the practical gain levels that can lead to self-oscillation in the amplifier. These measurements lead to the choice of a system in which a train of 10 - 15 microsec pulses at a repetition rate of 10 - 12 kc is amplified by a 50-meter length of dc-excited power amplifier. (Author)
AD-653 725 HC$3.00 MF$0.65

RADIATION EFFECTS ON ELECTRONIC PARTS AND MATERIALS.
IBM Electronics Systems Center Owego N Y
For primary bibliographic entry see Field 9A.
AD-653 794 HC$3.00 MF$0.65

WIND-WEIGHTING FACTORS FOR FALLOUT CALCULATIONS.
Technical rept.,
National Military Command System Support Center Washington D C
Fritz A. Hedman, and Ralph C. Simmons. 20 Dec 66, 40p Rept no. NMCSSC-TR-10-66

Descriptors: (*Radioactive fallout, *Wind), Models (Simulations), Particle size, Meteorology, Sampling, Armed forces supplies, Effectiveness, Aerosols, Mathematical analysis, Tables, Radiological warfare.

Particle rate of fall, available actual wind data, and total fallout radioactivity as a function of particle size have been critically reviewed as a basis for determining wind-weighting factors (WWF). Based on recently published analyses of fallout particle data, the recalculated typical (or nominal) diameter of radioactive local-fallout particles is 137 microns. A set of WWF for calculating mean effective wind vectors has been determined for use with actual wind data in predicting the location and military significance of radioactive fallout deposition. The WWF are used with fallout models such as the Weapons Systems Evaluation Group (WSEG) model. (Author)
AD-653 876 HC$3.00 MF$0.65

DECAY OF 102Ag AND LEVELS IN 102Pd,
California Univ Los Angeles Dept of Physics
Prasit Charoenkwan, and J. Reginald Richardson. 20 Oct 66, 10p
Contract Nonr-233 (44)
Prepared for presentation in part at two meetings of the American Physical Society.
Availability: Published in Nuclear Physics vA94 p417-26 1967.

Descriptors: (*Silver, *Decay schemes), (*Palladium, *Nuclear energy levels), Nuclear isomers, Radioactive decay, Half life, Nuclear spins, Beta decay, Gamma emission, Electron capture.

The decay of the 102Ag isomers was investigated using magentic-lens, scintillation and solid-state spectrometers. Half-lives of 13 plus or minus 0.4 and 7.7 plus or minus 0.5 min were assigned to the 5 (+) and 2 (+) spin isomers, respectively. Beta rays of 4.06, 3.37, 3.07, 2.26, 1.90, 1.50, 1.00 and 0.65 MeV end-points and gamma rays of 0.558, 0.727, 0.86, 1.01, 1.28, 1.60, 1.70, 1.80, 2.07, 2.79, 3.23 and 3.33 MeV were observed, and a large amount of K-capture was found. The isomeric transition proceeds by means of the internal conversion process. A partial decay scheme was proposed on the basis of the gamma-gamma, gamma-gamma-gamma, beta-gamma, and X-ray-gamma coincidences. (Author)
AD-654 071 Not available from CFSTI.

ON THE DECAY OF 106In,
California Univ Los Angeles Dept of Physics
For primary bibliographic entry see Field 20H.
AD-654 072 Not available from CFSTI.

GENERALIZED MODEL FOR SEMICONDUCTOR RADIATION RESPONSE PREDICTION.
Nortronics Newbury Park Calif Applied Research Dept
For primary bibliographic entry see Field 9A.
AD-654 134 HC$3.00 MF$0.65

SCATTERED RADIATION (SKYSHINE) CONTRIBUTION TO A CONCRETE-COVERED BASEMENT LOCATED IN A SIMULATED FALLOUT FIELD.
Final rept.,
Army Nuclear Defense Lab Edgewood Arsenal Md
Michael J. Schumchyk, Murray A. Schmoke, Ernest L. Schulman, and Edward O. Pollock. Jul 67, 76p Rept no. NDL-TR-69

Descriptors: (*Radioactive fallout, *Simulation), Gamma rays, Thickness, Concrete, Exposure, Underground structures, Cobalt, Shielding, Fallout shelters, Contamination, Measurement, Theory, Attenuation, Radioactivity, Sky, Reduction, Dosimeters, Tests.

The report determines, experimentally, the effect of overhead mass thickness on the shielding characteristics of a concrete-walled basement located in a simulated fallout field and compares the results with theoretical calculations set forth in NBS Monograph 42. A uniformly contaminated residual gamma radiation area was simulated to a radius of 600 feet with a cobalt 60 point-source circulation system. Experimental exposure-rate measurements were obtained in the free field and also within a concrete-covered basement as a function of height above the basement floor. Ionization chamber dosimeters were used as radiation detectors. Experimental measurements were extrapolated by analytical procedures to infinite field conditions and divided by the infinite free-field exposure rate measured 3 feet above ground to find the reduction factors. These reduction factors were compared with the theoretical results. (Author)
AD-654 151 HC$3.00 MF$0.65

PHYSICS DIVISION SUMMARY REPORT. ANNUAL REVIEW, APRIL 1, 1965-MARCH 31, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
ANL-7246 HC$3.00 MF$0.65

REACTOR PHYSICS DEPARTMENT TECHNICAL ACTIVITIES QUARTERLY REPORT, JULY-SEPTEMBER 1966.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
15 Oct 66, 72p
Contract AT (45-1)-1830

Descriptors: (*Reactor theory, *Thermal reactors), (*Fast reactors, Nuclear engineering), Scientific research, Reports.

For abstract, see NSA 21 13.
BNWL-340 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

FALLOUT PROGRAM QUARTERLY SUMMARY REPORT DECEMBER 1, 1966-MARCH 1, 1967. APPENDIX.
New York Operations Office (AEC), N. Y. Health and Safety Lab.
Edward P. Hardy, Jr., and Joseph Rivera. 1 Apr 67, 218p

Descriptors: (*Radioactive fallout, *Radiobiology), (*Strontium, *Radioactive isotopes), Health physics.

For abstract, see NSA 21 13.
HASL-181 HC$3.00 MF$0.65

PROTECTIVE SHIPPING PACKAGES FOR 8- AND 12-INCH DIAMETER UF6 CYLINDERS,
Oak Ridge Gaseous Diffusion Plant, Tenn.
A. J. Mallett, and C. E. Newlon. 20 Apr 67, 37p
Contract W-7405-eng-26

Descriptors: (*Packaging, *Packing materials), (*Cylindrical bodies, *Transportation), Uranium compounds, Fluorides, Fission products.

For abstract, see NSA 21 13.
K-1714 HC$3.00 MF$0.65

CRITICAL MASS REDUCTION,
Los Alamos Scientific Lab., N. Mex.
George A. Jarvis, and Carroll B. Mills. 1 Dec 66, 14p
Contract W-7405-eng-36

Descriptors: (*Critical assemblies, *Reactor cores), (*Radioactive isotopes, Uranium), Beryllium, Reduction, Reflectors, Polyethylene plastics.

For abstract, see NSA 21 13.
LA-3651 HC$3.00 MF$0.65

INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE-8.
Oak Ridge National Lab., Tenn.
Mar 67, 242p
Contract W-7405-eng-26

Descriptors: (*Reactor safety systems, Bibliographies), (*Reactor system components, Nuclear engineering), Indexes, Safety devices.

For abstract, see NSA 21 13.
ORNL-NSIC-32 HC$3.00 MF$0.65

SOLID STATE DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING DECEMBER 31, 1966.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 20L.
For abstract, see NSA 21 13.
ORNL-4098 HC$3.00 MF$0.65

ANALYSIS OF AMERICIUM BY CALORIMETRY,
Dow Chemical Co., Golden, Colo. Rocky Flats Div.
Diana L. Davis, and Franklin L. Oetting. 13 Apr 67, 8p
Contract AT (29-1)-1106

Descriptors: (*Americium, *Calorimetry), (*Transuranium compounds, *Radioactive isotopes), Radioactive decay.

For abstract, see NSA 21 13.
RFP-89 HC$3.00 MF$0.65

CALCULATION OF LOCAL SPECTRUM AND FUEL COMPOSITION CHARACTERISTICS,
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
P. G. Lacey. Feb 67, 100p
Contract AT (30-1)-3017

Descriptors: (*Reactor fuels, *Reactor lattice parameters), (*Reactor fuel rods, *Reactor cores), Plutonium, Production.

For abstract, see NSA 21 13.
WCAP-6066 HC$3.00 MF$0.65

18I. REACTOR ENGINEERING AND OPERATION

RESEARCH STUDY OF A CO2 LASER RADAR TRANSMITTER.
Raytheon Co Waltham Mass Research Div
For primary bibliographic entry see Field 18H.
AD-653 725 HC$3.00 MF$0.65

HEAVY WATER ORGANIC COOLED REACTOR.
Quarterly technical progress rept., Jan-Mar 66.
Atomics International, Canoga Park, Calif.
15 May 66, 184p
Contract AT (38-1)-430
Prepared in cooperation with Combustion Engineering, Inc., Windsor, Conn. Nuclear Div.

Descriptors: (*Heavy water, *Organic cooled reactors), (*Nuclear power plants, *Reactor lattice parameters), Reactor fuel cladding, Reactor fuel rods.

For abstract, see NSA 21 13.
AI-CE-31 HC$3.00 MF$0.65

FEASIBILITY STUDY OF NUCLEAR STEAM SUPPLY SYSTEM USING 10,000-MW, SODIUM-COOLED BREEDER REACTOR,
Argonne National Lab., Ill. Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
K. A. Hub, I. Charak, D. E. Lutz, and D. A. Menely.Sep 66, 210p
Contract W-31-109-eng-38
Prepared in cooperation with Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.

Descriptors: (*Breeder reactors, Reactor feasibility studies), (*Reactor coolants, Nuclear engineering), *Reactor cores, Sodium, Steam, Fast reactors, Reactor fuels, Reactor safety systems.

For abstract, see NSA 21 13.
ANL-7183 HC$3.00 MF$0.65

REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT. FEBRUARY 1967.
Argonne National Lab., Ill.
28 Mar 67, 106p
Contract W-31-109-eng-38

Descriptors: (*Reactor fuels, *Plutonium), (*Reactor materials, Uranium), Reactor fuel rods, Reactor fuel cladding, Breeder reactors, Fast reactors.

For abstract, see NSA 21 13.
ANL-7308 HC$3.00 MF$0.65

EXPERIMENTAL STUDIES ON HIGH-GRAVITY ROTATING FLUIDIZED BEDS,
Brookhaven National Lab., Upton, N. Y.
G. C. Lindauer, P. Tichler, and L. P. Hatch. Sep 66,
Contract AT (30-2)-GEN-16

Descriptors: (*Fluidized bed processes, Scientific research), Rotation, Gravity, Compressed air, Acceleration, Velocity, Heat transfer, Reactor fuel elements, Gas flow.

For abstract, see NSA 21 13.
BNL-50013 HC$3.00 MF$0.65

REACTION OF MOLTEN UO2 WITH WATER,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 21 13.
BNWL-362 HC$3.00 MF$0.65

INFRARED DETECTION OF NUCLEAR REACTOR COOLANT IMPURITIES,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
BNWL-377 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

SMALL NUCLEAR POWER PLANTS. VOLUME TWO. THE INDUSTRIAL EXPRESSION OF SUPPLY AND DEMAND CONSIDERATIONS.
Chicago Operations Office (AEC), Ill. Reactor Engineering Div.
Mar 67, 164p

Descriptors: (*Nuclear power plants, Economics), (*Power reactors, Costs), Boiling water reactors, Pressurized water reactors, Heat transfer, Reactor fuels.

For abstract, see NSA 21 13.
COO-284 (Vol 2) HC$3.00 MF$0.65

SMALL NUCLEAR POWER PLANTS. VOLUME THREE. A GENERAL AND ECONOMIC ASSESSMENT.
Kaiser Engineers, Oakland, Calif.
Mar 67, 160p

Descriptors: (*Nuclear power plants, Economics), (*Nuclear engineering, *Energy management), Construction, Operation, Design.

For abstract, see NSA 21 13.
COO-284 (Vol 3) HC$3.00 MF$0.65

ZERO-POWER MEASUREMENTS ON A HIGH-FLUX DEMONSTRATION LATTICE,
Du Pont De Nemours (E. I.) And Co., Aiken, S. C. Savannah River Lab.
A. E. Dunklee, and C. E. Jewell. Apr 67, 65p
Contract AT (07-2)-1

Descriptors: (*Reactor lattice parameters, Reactor operation), (*Neutron flux, Reactor system components), Production reactors.

For abstract, see NSA 21 13.
DP-1076 HC$3.00 MF$0.65

STEP PROJECT.
Quarterly technical rept., Apr-Jun 66,
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
K. A. Dietz. Jan 67, 164p
Contract AT (10-1)-205

Descriptors: (*Reactor fuels, *Reactor cores), (*Nuclear energy, *Fission products), Reactor safety systems, Radiation measurement systems, Neutron detectors.

For abstract, see NSA 21 13.
IDO-17187 HC$3.00 MF$0.65

TRANSIENT TESTS OF THE FULLY ENRICHED URANIUM-OXIDE STAINLESS STEEL PLATE-TYPE C-CORE IN THE SPERT III REACTOR DATA SUMMARY REPORT,
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
R. Scott, Jr., C. L. Hale, and R. N. Hagen.Feb 67, 182p
Contract AT (10-1)-205

Descriptors: (*Reactor cores, Uranium compounds), (*Reactor fuel enrichment, Oxides), Stainless steel, Metal plates, Reactor cores, Reactor lattice parameters, Reactor fuel elements.

For abstract, see NSA 21 13.
IDO-17223 HC$3.00 MF$0.65

STUDIES OF REACTOR CONTAINMENT. VOLUME III. SELECTION OF EQUATIONS-OF-STATE FOR BLAST SHIELD DESIGN.
Final rept.,

IIT Research Inst., Chicago, Ill.
Paul Lieberman. Feb 67, 214p
Contract AT (11-1)-578

Descriptors: (*Containment, Equations of state), (*Reactor operation, *Reactor shielding calculations), Blast, Graphics, Impact, Computers.

For abstract, see NSA 21 13.
IITRI-578P21-19 HC$3.00 MF$0.65

PM-2A REACTOR VESSEL TEST PROGRAM.
Final Rept.,
Idaho Nuclear Corp., Idaho Falls.
D. R. Mousseau, J. C. Pruden, and S. J. Gold. Mar 67, 133p
Contract AT (10-1)-1230

Descriptors: (*Pressure vessels, *Brittleness), (*Fracture (Mechanics), Non-destructive testing), Failure (Mechanics), Radiation measurement systems.

For abstract, see NSA 21 13.
IN-1061 HC$3.00 MF$0.65

DESIGN AND OPERATION OF A SLOW NEUTRON CHOPPER,
Ames Lab., Iowa.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
IS-1544 HC$3.00 MF$0.65

DECALIBRATION OF A TUNGSTEN-TUNGSTEN 25 PERCENT RHENIUM THERMOCOUPLE IN A NEUTRON FLUX,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
LA-3662 HC$3.00 MF$0.65

THERMO-FLUX VARIATIONS IN THE PLUTO TYPE RESEARCH REACTORS DUE TO CONTROL-ABSORBER MOVEMENT.
United Kingdom Atomic Energy Authority, Harwell (England). Research Reactors Div.
M. J. Crook, and I. S. Mc Gill. Nov 66, 21p
AERE-M-1819

Descriptors: *Absorber, *Heat flux, *Water moderated reactor, Aluminum, Control, Deuterium, Element, Flux, Fuel, Heat, Moderation, Pluto reactor, Reactor, Steel, Water.

For abstract, see STAR 05 15.
N67-27782 HC$3.00 MF$0.65

DIGITAL REACTIVITY MEASUREMENTS BY A ROD DRIVE METHOD.
Reactor Centrum Nederland, Petten.
E. Tuerkcan. Feb 67, 19p RCN-65

Descriptors: *Control rod, *Digital technique, *Reactor, *Reactor control, Amplifier, Computer, Control, Critical, Digital, Drive, Equation, Flux, Height, Kinetics, Measurement, Method, Movement, Nuclear, Nuclear reactor, Position, Program, Reactivity, Rod, Slow, Technique, Water.

For abstract, see STAR 05 15.
N67-28705 HC$3.00 MF$0.65

INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE-8.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
ORNL-NSIC-32 HC$3.00 MF$0.65

THE HIGH FLUX ISOTOPE REACTOR ACCIDENT ANALYSIS,
Oak Ridge National Lab., Tenn.
F. T. Binford, and E. N. Cramer. Apr 67, 287p
Contract W-7405-eng-26

Descriptors: (*Reactor accidents, *Light water reactors), (*Plutonium, *Radioactive isotopes), Reactor operation, Reactor cores, Reactor reactivity, Neutron flux, Radioactive decay, Helium group gases.

For abstract, see NSA 21 13.
ORNL-3573 HC$3.00 MF$0.65

EVALUATION OF HEAVY-WATER-MODERATED ORGANIC-COOLED REACTORS,
Oak Ridge National Lab., Tenn.
P. R. Kasten, R. E. Adams, and R. S. Carlsmith. Jan 67, 387p
Contract W-7405-eng-26

Descriptors: (*Heavy water reactors, *Reactor coolants), (*Organic moderated reactors, Reactor materials), (*Organic cooled reactors, Costs, Reactor cores.

For abstract, see NSA 21 13.
ORNL-3921 HC$3.00 MF$0.65

ON-SITE FUEL PROCESSING AND RECYCLE PLANT DESIGN STUDY.
Oak Ridge National Lab., Tenn.
W. E. Unger, F. E. Harrington, and J. R. May. Apr 67, 108p
Contract W-7405-eng-26

Descriptors: (*Reactor fuel processing, Chemistry), (*Industrial plants, *Chemical industry), Economics, Nuclear power plants, Costs, Reactor hazards, Maintenance.

For abstract, see NSA 21 13.
ORNL-3959 HC$3.00 MF$0.65

MOLTEN-SALT REACTOR PROGRAM. SEMI-ANNUAL PROGRESS REPORT FOR PERIOD ENDING AUGUST 31, 1966.
Oak Ridge National Lab., Tenn.
Jan 67, 254p
Contract W-7405-eng-26

Descriptors: (*Reactor operation, Heat transfer), (*Reactor fuels, *Reactor coolants), Performance (Engineering), Heat exchangers.

For abstract, see NSA 21 13.
ORNL-4037 HC$3.00 MF$0.65

BEHAVIOR OF IODINE IN AIR A RESUME OF THE FIRST SEVEN RUNS CONDUCTED AT THE NUCLEAR SAFETY PILOT PLANT,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18G.
For abstract, see NSA 21 13.
ORNL-4050 HC$3.00 MF$0.65

LIGHT BULB MODEL OF FISSION PRODUCT RELEASE FROM REACTOR FUELS,
Oak Ridge National Lab., Tenn.
C. E. Miller, Jr. Apr 67, 23p
Contract W-7405-eng-26

Descriptors: (*Reactor fuels, *Fission products), (*Mathematical models, *Mathematical prediction), Boundary layer, Diffusion.

For abstract, see NSA 21 13.
ORNL-4060 HC$3.00 MF$0.65

NUCLEAR DESALINATION PROGRAM. ANNUAL PROGRESS REPORT ON ACTIVITIES SPONSORED BY THE ATOMIC ENERGY COMMISSION FOR PERIOD ENDING OCTOBER 31, 1966,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 7A.
For abstract, see NSA 21 13.
ORNL-4087 HC$3.00 MF$0.65

RADIATION METALLURGY SECTION, SOLID STATE DIVISION PROGRESS REPORT FOR PERIOD ENDING JANUARY 1967.
Oak Ridge National Lab., Tenn.
Apr 67, 53p
Contract W-7450-eng-26

Descriptors: (*Metallurgy, *Solid state physics), (*Radiation damage, *Niobium), Interactions, Impurities, Etching, Crystal lattice defects, Diffusion.

For abstract, see NSA 21 13.
ORNL-4097 HC$3.00 MF$0.65

18J. REACTOR MATERIALS

HEAVY WATER ORGANIC COOLED REACTOR.
Atomics International, Canoga Park, Calif.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
AI-CE-31 HC$3.00 MF$0.65

REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT. FEBRUARY 1967.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
ANL-7308 HC$3.00 MF$0.65

REACTOR PHYSICS DEPARTMENT TECHNICAL ACTIVITIES QUARTERLY REPORT, JULY-SEPTEMBER 1966.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
BNWL-340 HC$3.00 MF$0.65

REACTION OF MOLTEN UO2 WITH WATER,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
R. L. Gibby. Jan 67, 10p
Contract AT (45-1)-1830

Descriptors: (*Uranium compounds, Dioxides), Melting, Water, Particle size, Quenching (Cooling), Powders, X-ray diffraction analysis, Oxidation, Nuclear reactors.

For abstract, see NSA 21 13.
BNWL-362 HC$3.00 MF$0.65

THE IRRADIATION BEHAVIOR OF UO2-PUO2 FUELS IN PRTR,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
M. D. Freshley, and F. E. Panisko. Mar 67, 27p
Contract AT (45-1)-1830

Descriptors: (*Test reactors, *Plutonium compounds), (*Uranium compounds, Oxides), Reactor fuels, Reactor system components, Nuclear radiation.

For abstract, see NSA 21 13.
BNWL-366 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.

For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

SMALL NUCLEAR POWER PLANTS. VOLUME TWO. THE INDUSTRIAL EXPRESSION OF SUPPLY AND DEMAND CONSIDERATIONS.
Chicago Operations Office (AEC), Ill. Reactor Engineering Div.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
COO-284 (Vol 2) HC$3.00 MF$0.65

ZERO-POWER MEASUREMENTS ON A HIGH-FLUX DEMONSTRATION LATTICE,
Du Pont De Nemours (E. I.) And Co., Aiken, S. C. Savannah River Lab.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
DP-1076 HC$3.00 MF$0.65

STEP PROJECT.
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
IDO-17187 HC$3.00 MF$0.65

TRANSIENT TESTS OF THE FULLY ENRICHED URANIUM-OXIDE STAINLESS STEEL PLATE-TYPE C-CORE IN THE SPERT III REACTOR DATA SUMMARY REPORT,
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
IDO-17223 HC$3.00 MF$0.65

THE USE OF (U. PU)N FUEL WITH A SODIUM BOND A SUMMARY OF EXISTING DATA,
Los Alamos Scientific Lab., N. Mex.
B. J. Thamer. 6 Jan 67, 12p
Contract W-7405-eng-36

Descriptors: (*Reactor fuels, Uranium), (*Plutonium, *Nitrogen), Sodium, Bonding, Reactor fuel cladding.

For abstract, see NSA 21 13.
LA-3646 HC$3.00 MF$0.65

REACTOR FUELS AND MATERIALS DEVELOPMENT PLUTONIUM RESEARCH JANUARY-MARCH 1966,
Mound Lab., Miamisburg, Ohio.
L. J. Wittenberg, and G. R. Grove. 7 Apr 67, 34p
Contract AT (33-1)-GEN-53

Descriptors: (*Reactor fuels, *Plutonium), (*Reactor materials, Scientific research), Phase studies, Physical properties, Ceramic materials.

For abstract, see NSA 21 13.
MLM-1346 HC$3.00 MF$0.65

ROLLING STUDIES OF URANIUM RODS AND TUBES,
National Lead Co., Cincinnati, Ohio.
H. W. Hesselbrock. Apr 67, 35p
Contract AT (30-1)-1156

Descriptors: (*Rolling (Metallurgy), Uranium), Rods, Pipes, Extrusion, Reactor Cores, Reactor fuels, Grain structures (Metallurgy), Material forming.

For abstract, see NSA 21 13.
NLCO-990 HC$3.00 MF$0.65

SUMMARY TECHNICAL REPORT FOR THE PERIOD JANUARY 1, 1967-MARCH 31, 1967,
National Lead Co., Cincinnati, Ohio.
R. Burgett. Apr 67, 31p
Contract AT (30-1)-1156

Descriptors: (*Uranium alloys, *Rods), (*Neptunium, *Plutonium), Solutions, Defects (Materials), Metallography.

For abstract, see NSA 21 13.
NLCO-996 HC$3.00 MF$0.65

USE OF PLUTONIUM AS A FUEL IN NUCLEAR REACTORS QUARTERLY REPORT, 1 APR. - 30 JUN. 1966.
Societe Belge pour L Industrie Nucleaire, Brussels (Belgium).
Sep 66, 81p QR-10, BN-6609-30
Contract EURATOM-001-64-1 TRUB

Descriptors: *Plutonium, *Reactor fuel, Compression, Fuel, Fusion, Material, Nuclear, Powder, Reactor, Rod, Testing, Vibration, Welding.

For abstract, see STAR 05 15.
N67-28458 HC$3.00 MF$0.65

INDEXED BIBLIOGRAPHY OF CURRENT NUCLEAR SAFETY LITERATURE-8.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
ORNL-NSIC-32 HC$3.00 MF$0.65

EVALUATION OF HEAVY-WATER-MODERATED ORGANIC-COOLED REACTORS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
ORNL-3921 HC$3.00 MF$0.65

MOLTEN-SALT REACTOR PROGRAM. SEMI-ANNUAL PROGRESS REPORT FOR PERIOD ENDING AUGUST 31, 1966.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
ORNL-4037 HC$3.00 MF$0.65

URANIUM PLUTONIUM CARBIDE DEVELOPMENT.
Quarterly progress rept for 31 Dec 66.
Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Reactors Div.
Feb 67, 34p
Contract AT (30-1)-3791

Descriptors: (*Uranium compounds, *Plutonium compounds), (*Carbides, *Reactor fuel elements), Fast reactors, Breeder reactors.

For abstract, see NSA 21 13.
WCAP-3791-2 HC$3.00 MF$0.65

CALCULATION OF LOCAL SPECTRUM AND FUEL COMPOSITION CHARACTERISTICS,
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
WCAP-6066 HC$3.00 MF$0.65

18K. REACTOR PHYSICS

PHYSICS DIVISION SUMMARY REPORT. ANNUAL REVIEW, APRIL 1, 1965-MARCH 31, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
ANL-7246 HC$3.00 MF$0.65

REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT. FEBRUARY 1967.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
ANL-7308 HC$3.00 MF$0.65

REACTOR PHYSICS DEPARTMENT TECHNICAL ACTIVITIES QUARTERLY REPORT, JULY-SEPTEMBER 1966.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
BNWL-340 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

CRITICAL MASS REDUCTION,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
LA-3651 HC$3.00 MF$0.65

SOME FLUX MEASUREMENTS IN MOCK-UP POWER. CYCLING RIGS (PLUTO 7 V TYPE).
United Kingdom Atomic Energy Authority, Harwell (England). Research Reactors Div.
M. J. Crook, and I. S. Mc Gill. Nov 66, 10p
AERE-M-1820

Descriptors: *Neutron flux, *Reactor physics, Cycling, Distribution, Flux, Fuel, Neutron, Physics, Pluto reactor, Power, Reactor, Shutter, Thermal.

For abstract, see STAR 05 15.
N67-27784 HC$3.00 MF$0.65

ELECTRONICS DEPARTMENT QUARTERLY REPORT, 1 JUL. - 30 SEP. 1966.
Atomic Energy Commission Research Establishment, Riso (Denmark).
Nov 66, 23p RISO-M-501, R-10-66
in Danish and English

Descriptors: *Irradiation, *On-line programming, *Reactor, Analog, Blood, Circuit, Computer, Data, Detector, Digital, Electronics, Human, Neutron, Programming, Spectrometer, Transmission.

For abstract, see STAR 05 15.
N67-27901 HC$3.00 MF$0.65

THE STEADY STATE AND DYNAMIC BEHAVIOR OF A BOILING WATER REACTOR QUARTERLY PROGRESS REPORT, 1 APR. - 1 JUL. 1966.
Technische Hogeschool, Eindhoven (Netherlands).
Jul 66, 22p EURAEC-1745, EUR-3305
Contract EURATOM-030-64-1 TEEN

Descriptors: *Boiling water reactor, *Dynamic stability, *Steady state, Behavior, Boiling, Capacity, Dynamic, Element, Heat, Measurement, Reactor, Stability, State, Steady, Water.

For abstract, see STAR 05 15.
N67-28312 HC$3.00 MF$0.65

HEAT TRANSFER AND FLUID FLOW CHARACTERISTICS IN A PRESSURIZED

Group 18K—Reactor physics

WATER REACTOR QUARTERLY REPORT, 1 APR. - 1 JUL. 1966.
Technische Hogeschool, Eindhoven (Netherlands).
Aug 66, 22p EURAEC-1724, EUR-2896
Contract EURATOM-011-64-1-TEEN (RD)

Descriptors: *Heat transfer, *Pressurized water reactor, *Recirculative fluid flow, Calibration, Characteristic, Experiment, Flow, Fluid, Instrumentation, Loop, Mixing, Pressurization, Reactor, Recirculation, Section, Test, Water.

For abstract, see STAR 05 15.
N67-28313 HC$3.00 MF$0.65

CALCULATION OF LOCAL SPECTRUM AND FUEL COMPOSITION CHARACTERISTICS,
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
WCAP-6066 HC$3.00 MF$0.65

18L. REACTORS (POWER)

HEAVY WATER ORGANIC COOLED REACTOR.
Atomics International, Canoga Park, Calif.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
AI-CE-31 HC$3.00 MF$0.65

FEASIBILITY STUDY OF NUCLEAR STEAM SUPPLY SYSTEM USING 10,000-MW, SODIUM-COOLED BREEDER REACTOR,
Argonne National Lab., Ill. Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
ANL-7183 HC$3.00 MF$0.65

SMALL NUCLEAR POWER PLANTS. VOLUME TWO. THE INDUSTRIAL EXPRESSION OF SUPPLY AND DEMAND CONSIDERATIONS.
Chicago Operations Office (AEC), Ill. Reactor Engineering Div.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
COO-284 (Vol 2) HC$3.00 MF$0.65

SMALL NUCLEAR POWER PLANTS. VOLUME THREE. A GENERAL AND ECONOMIC ASSESSMENT.
Kaiser Engineers, Oakland, Calif.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
COO-284 (Vol 3) HC$3.00 MF$0.65

PM-2A REACTOR VESSEL TEST PROGRAM.
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
IN-1061 HC$3.00 MF$0.65

EVALUATION OF HEAVY-WATER-MODERATED ORGANIC-COOLED REACTORS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
ORNL-3921 HC$3.00 MF$0.65

ON-SITE FUEL PROCESSING AND RECYCLE PLANT DESIGN STUDY.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
ORNL-3959 HC$3.00 MF$0.65

NUCLEAR DESALINATION PROGRAM. ANNUAL PROGRESS REPORT ON ACTIVITIES SPONSORED BY THE ATOMIC ENERGY COMMISSION FOR PERIOD ENDING OCTOBER 31, 1966,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 7A.
For abstract, see NSA 21 13.
ORNL-4087 HC$3.00 MF$0.65

CALCULATION OF LOCAL SPECTRUM AND FUEL COMPOSITION CHARACTERISTICS,
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
WCAP-6066 HC$3.00 MF$0.65

18M. REACTORS (NON-POWER)

PHYSICS DIVISION SUMMARY REPORT. ANNUAL REVIEW, APRIL 1, 1965-MARCH 31, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
ANL-7246 HC$3.00 MF$0.65

REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT. FEBRUARY 1967.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
ANL-7308 HC$3.00 MF$0.65

ZERO-POWER MEASUREMENTS ON A HIGH-FLUX DEMONSTRATION LATTICE,
Du Pont De Nemours (E. I.) And Co., Aiken, S. C. Savannah River Lab.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
DP-1076 HC$3.00 MF$0.65

EVALUATION OF HEAVY-WATER-MODERATED ORGANIC-COOLED REACTORS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
ORNL-3921 HC$3.00 MF$0.65

18N. SNAP TECHNOLOGY

PROMETHIUM ISOTOPIC POWER DATA SHEETS,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18B.
For abstract, see NSA 21 13.
BNWL-363 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

STEP PROJECT.
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
IDO-17187 HC$3.00 MF$0.65

19. ORDNANCE

19A. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

A STUDY OF THE DYNAMICS OF AN UNTUNED CLOCK MECHANISM.
Virgina Military Inst Lexington Dept of Physics
1 Sep 53, 64p
Contract NBS-CST-1224
See also AD-653 771.

Descriptors: (*Clock delay mechanisms, Dynamics), Rods, Shafts, Gears, Differential equations, Equations of motion, Torque, Moment of inertia.

As a first approach to the study of untuned clock mechanisms, the physical behaviour of the verge-star wheel combination of the Lux clock mechanism was studied by means of a scaled-up model. Differential equations of motion for the motion were developed and solved. Curves showing typical motions were obtained. The dependence of equilibrium velocities (or equilibrium time delays) upon (1) applied torque, (2) star wheel moment of inertia, (3) verge moment of inertia, was studied. (Author)
AD-653 770 HC$3.00 MF$0.65

A STUDY OF THE EFFECT OF GEOMETRICAL FACTORS UPON THE BEHAVIOUR OF AN UNTUNED CLOCK MECHANISM.
Virgina Military Inst Lexington Dept of Physics
30 Jun 54, 38p
Contracts NBS-CST-1224, DA1-49-186-ORD (P)-100
See also AD-653 770.

Descriptors: (*Clock delay mechanisms, Dynamics), Geometry, Shafts, Gears, Model tests, Equations of motion, Velocity, Rods.

The dependence on time delay of the following geometrical factors was determined empirically: (1) the angle at the verge corner, (2) the center to center distance, verge to wheel, (3) the radius of the tooth circle of the wheel, (4) the position of the corne points of the verge with respect to the axis of rotation of the verge. It was found that except in case (1), the empirical relationship T = B (tau to the minus 0.5 power)I sub v to the .612 power (I sub w to the minus .112 power) must be rewritten (the powers of I sub v and I sub w) to predict times T. The given relationship is correct for the geometrical situation of case (1). In each of the case (2), (3), and (4) a linear relationship (approximately) is found to hold when values of T are plotted against values of the geometrical factor being varied. The work was actually carried out for a scaled up model of a particular untuned clock mechanism. (Author)
AD-653 771 HC$3.00 MF$0.65

THE EFFECT OF UNBALANCED VERGE TORQUES, ACCELERATION FRICTION TORQUES, AND VERGE-STARWHEEL MATERIAL UPON THE RUNNING RATES OF A CERTAIN TYPE OF TIME DELAY MECHANISM.
Virgina Military Inst Lexington Dept of Physics
Jan 55, 23p
Contract DA1-49-186-502-ORD (P)-186
See also AD-653 773.

Descriptors: (*Clock delay mechanisms, Dynamics), Rods, Operation, Velocity, Torque, Gears, Shafts, Equations of motion, Friction.

Three factors not hitherto considered will effect the running rate of a certain type of time delay mechanism. (1) If the verge is not balanced, when it is accelerated an unbalanced torque is set up. Under extreme conditions of acceleration and unbalance the running rate would not be changed by more than a few percent. The mechanism will run

faster if the unbalanced torque is applied to trailing side of verge, slower for torque on leading side, at least until certain jamming values of torque are reached. (2) Friction has been neglected in our previous reports. As the mechanism accelerates this friction torque is increased. There was no agreement between theory and experiment. All experimental results indicate an increase in the running rate as friction torque increases up to the jamming point. (3) If the material of the verge and starwheel is changed, the running rate will change, but probably not more than 5% from the value for brass. (Author)
AD-653 772 HC$3.00 MF$0.65

A STUDY OF THE NON-UNIFORMITY IN RUNNING RATES OF A CERTAIN TYPE OF TIME DELAY MECHANISM.
Virgina Military Inst Lexington Dept of Physics
31 Aug 54, 26p
Contract DAI-49-186-502-ORD (P)-186
See also AD-653 771.

Descriptors: (*Clock delay mechanisms, Dynamics), Rods, Gears, Analysis of variance, Operation, Torque, Velocity.

From a study of nearly 300 samples of a certain type of clock mechanism it was found that the period varies some 8% above and below the most popular value. The most important reasons for this variation are (1) the differences in geometrical dimensions of the verges, (2) the differences in the center to center spacing of verge and starwheel shafts, (3) the friction of the gear train which transmits the torque from the spring to the starwheel. It was shown that shape or condition of shafts and bearing holes is relatively unimportant. Less important effects were also noted. All work described was carried out on the assumption that the mechanism is not being accelerated as a whole. (Author)
AD-653 773 HC$3.00 MF$0.65

AN UNTUNED CLOCK MECHANISM OF SPECIAL DESIGN, PART I; AN EXPERIMENTAL STUDY OF THE MOTION OF AN UNTUNED CLOCK, PART II.
Virgina Military Inst Lexington Dept of Physics
Jun 56, 23p
Contract DAI-49-186-502-ORD (P)-186
See also AD-653 772.

Descriptors: (*Clock delay mechanisms, Dynamics), Equations of motion, Design, Shafts, Gears, Experimental data, Configuration.

An untuned clock mechanism with specially designed verge faces is described. This mechanism operates in a symmetric cycle in reference to leading and trailing faces of the verge. A study of this verge design indicates a probable minimizing of the effects of geometrical variations of the leading face, observed with normal verges. Part II of this report represents some experimental results on the motions of verge and starwheel in the equilibrium cycle. (Author)
AD-653 784 HC$3.00 MF$0.65

EFFECT OF ALUMINUM ON THE RATE OF DETONATION OF TNT.
Final rept. no. 1,
Picatinny Arsenal Dover N J
Leo S. Wise. 26 Jul 45, 62p Rept no. PA-TR-1550

Descriptors: (*TNT, Detonations), (*Aluminum, Explosive materials), Mixtures, Density, Particle size, Powder metals, Explosions, Theory, Burning rate.

The rates of detonation of mixtures of TNT and aluminum in both the cast and pressed condition have been determined over a wide range of densities and percentages of aluminum. It was shown that the addition of aluminum to TNT in any proportion up to 40% decreases the rate of detonation. The mechanism of the explosive reaction is discussed. It is postulated that the aluminum remains chemically inert during its passage through the zone of decomposition of the TNT and causes a reduction of the rate of detonation by extracting thermal energy from the reaction zone. A Theory of Thermal Dilution is proposed which is based on a simultaneous application of the Hydrodynamic Theory, the Theory of Explosive Reactions, and the Theory of Heat Conduction.
AD-654 028 HC$3.00 MF$0.65

STUDY OF ACID ADSORPTION AND HYDROLYSIS OF CELLULOSE NITRATE AND CELLULOSE SULPHATE.
Picatinny Arsenal Dover N J
For primary bibliographic entry see Field 7D.
AD-654 029 HC$3.00 MF$0.65

DEVELOPMENT OF STANDARD TESTS APPLICATION OF THE IMPACT AND SAND TESTS TO THE STUDY OF NITROGLYCERIN AND OTHER LIQUID EXPLOSIVES.
Technical rept.,
Picatinny Arsenal Dover N J
A. J. Clear, and W. R. Tomlinson, Jr. 13 Jun 49, 23p Rept no. 1, PA-TR-1738

Descriptors: (*Impact tests, *Nitroglycerin), (*Explosive materials, Impact tests), Liquids, Azides, Sand, Lead compounds, TNT, DNT, Glycols, Methane, Glycerols, Nitrates, Sensitivity, Tables.

The study contains tables of sensitivity to Impact and Sand Test Values of Liquid Explosives. (Author)
AD-654 050 HC$3.00 MF$0.65

HOT-WIRE IGNITION OF SECONDARY EXPLOSIVES IN SQUIBS,
Los Alamos Scientific Lab., N. Mex.
Robert J. Reithel. 30 Jan 64, 23p
Contract W-7405-eng-36

Descriptors: (*Explosives initiators, *Explosive materials), (*Cartridges, Ignition), Detonators, Gases, Explosions, Wire, RDX.

For abstract, see NSA 21 13.
LA-3668 HC$3.00 MF$0.65

19D. EXPLOSIONS, BALLISTICS, AND ARMOR

APPLICATION OF NANOSECOND LIGHT PULSES TO BALLASTIC RANGE MEASUREMENTS,
Massachusetts Inst of Tech Lexington Lincoln Lab
Wallace G. Clay, Anthony P. Ferninand, Richard E. Slattery, and Charles R. Kilcline. 4 Oct 66, 3p Rept no. JA-2911
ESD-TR-67-232
Contract AF 19 (628)-5167, ARPA Order-512
Availability: Published in AIAA Journal p364-5 Feb 1967.

Descriptors: (*Light pulses, *Ballistics), Lasers, Projectiles, Trajectories, Hypersonic flight, Ablation, Spark shadowgraph photography, Optical analysis.

Recent developments have made nanosecond light sources available to study rapid transient phenomena, expecially in ballistic ranges. For instance, projectile integrity and ablation can be obtained using such light sources. (Author)
AD-653 498 Not available from CFSTI.

MECHANICAL PROPERTIES AND BONDING EFFICIENCY OF STEEL COMPOSITES,
Army Materials Research Agency Watertown Mass
For primary bibliographic entry see Field 11F.
AD-653 545 HC$3.00 MF$0.65

REFRACTION OF UNDERWATER EXPLOSION SHOCK WAVES: PRESSURE HISTORIES MEASURED AT CAUSTICS IN A FLOODED QUARRY,
Naval Ordnance Lab White Oak Md
Robert M. Barash, and Jean A. Goertner. 19 Apr 67, 109p Rept no. NOLTR-67-9
Research supported in part by DASA.

Descriptors: (*Shock waves, Refraction), (*Underwater explosions, Pressure), High-explosive ammunition, Propagation, Acoustics, Energy.

High explosive charges were fired in a flooded quarry having a refractive sound velocity structure, in order to observe shock wave pressure histories at caustics, or focal surfaces. For such regions, present theoretical understanding and conventional acoustic ray-tracing techniques are inadequate. Peak pressure amplification factors up to 5.8 were measured; the smaller the charge, the more extreme the focusing. Energy flux density was also enhanced, but impulse per unit area was relatively unaffected. (Author)
AD-653 741 HC$3.00 MF$0.65

THE 1965 MONTREAL, CANADA, APARTMENT HOUSE EXPLOSION: SOME NOTES AND COMPARISONS WITH THE INDIANAPOLIS, INDIANA, COLISEUM EXPLOSION.
Research rept.,
Ohio State Univ Columbus Disaster Research Center
David Adams. 10 Jan 67, 31p Rept no. DRC-RR-14
Contract OCD-PS-64-46
Revision of manuscript submitted 15 Jul 65.

Descriptors: (*Housing, *Explosions), Damage, Structures, Damage assessment, Organizations, Disasters, Communication systems, Fire safety, Canada, Indiana.

A team from the Disaster Research Center at Ohio State University studied the organizational response to an explosion in an apartment house complex in Montreal, Canada on March 1, 1965. A major purpose of the study was to examine how the emergency responses in this disaster were similar and/or different from those observed in the 1963 Coliseum explosion in Indianapolis, Indiana. In general, organizations in both disasters had somewhat the same kinds of difficulties in coordinating with other organizations and had similar convergence and communication problems. (Author)
AD-653 889 HC$3.00 MF$0.65

MECHANISMS IN THE GENERATION OF AIRBLASTS BY UNDERWATER EXPLOSIONS,
Bolt Beranek and Newman Inc Cambridge Mass
Charles I. Malme, Jaime R. Carbonell, and Ira Dyer. 23 Sep 66, 162p Rept no. BBN-1434
NOLTR-66-88
Contract N60921-7025

Descriptors: (*Blast, *Underwater explosions), Propagation, Experimental data, Interfaces, Explosion effects, Shock waves, Model tests.

Research studies and small-scale experimental tests were conducted to explore the formation and propagation of airblasts resulting from underwater explosions. 'Deep' explosions produce an interface velocity above the charge that is subsonic in air. The resulting airblast signature was found to be produced by acoustic radiation from a large surface area following the passage of the transmitted

shock. In general, the interface velocity could not be predicted by linear continuous theory because of cavitation and subsequent separation of the surface layers near the charge. When the interface velocity above the charge is supersonic, the character of the airblast signature becomes more shocklike and the explosion is said to be 'shallow.' While the airblast generating mechanisms of deep explosions are still present, their effect is generally overshadowed by the shock wave associated with the supersonically rising dome and plume. The intensity of this shock is closely related to the Mach number of the plume. This permits an approximate calculation of the peak airblast pressure using existing theory of off-axis shock-wave generation by supersonic blunt bodies. (Author)
AD-654 175 HC$3.00 MF$0.65

HOT-WIRE IGNITION OF SECONDARY EXPLOSIVES IN SQUIBS,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 19A.
For abstract, see NSA 21 13.
LA-3668 HC$3.00 MF$0.65

19G. ROCKETS

FINITE ELEMENT ANALYSIS FOR SOLID ROCKET MOTOR CASES.
Interim technical rept.,
Stanford Research Inst Menlo Park Calif
L. R. Herrmann, R. L. Taylor, and R. L. Green.
Mar 67, 45p
Contract N123 (60530)-55641A
Prepared in cooperation with California Univ., Berkeley. Structural Engineering Lab., rept. no. 67-4, and Glasgow Univ (Scotland).

Descriptors: (*Rocket cases, Mathematical analysis), Structural shells, Cylindrical bodies, Bodies of revolution, Analysis of variance, Strain (Mechanics), Rocket motors (Solid propellant).

A finite element development for shells of revolution and cylinders in plane strain is presented. The element is based upon a variational theorem which allows linear displacement expansions in each element, thus, an element is developed which is fully compatible with commonly employed continuum elements. A numerical example is presented along with a computer program listing for shells of revolution. (Author)
AD-653 750 HC$3.00 MF$0.65

20. PHYSICS

20A. ACOUSTICS

THE ACOUSTIC FIELD IN A CLOSED SPACE BEHIND A RECTANGULAR SIMPLY SUPPORTED PLATE EXCITED BY BOUNDARY LAYER TURBULENCE,
Navy Underwater Sound Lab New London Conn
Wayne A. Strawderman. 11 May 67, 158p Rept no. USL-827

Descriptors: (*Aerodynamic noise, Turbulent boundary layer), Pressure, Acoustics, Mathematical models, Spectroscopy, Acoustic properties, Hydrodynamics, Turbulence.

An analytic solution is obtained for the acoustic pressure statistics in a closed rectangular shaped cavity behind a simply supported, rectangular plate excited by boundary layer turbulence. The contribution of the cavity acoustic pressure is neglected as contributing to the plate excitation, leaving only the turbulent pressure fluctuations as the exciting force. The mathematical model for the turbulent pressure statistics is based on that of Corcos, which agrees well with experiment. A by-product of this analysis is an analytic solution for the turbulent flow excited plate vibration velocity statistics. The plate velocity and cavity acoustic pressure statistics are expressed in the form of cross power spectral densities and power spectral densities. Dimensionless forms of the plate velocity spectral density and cavity acoustic pressure spectral density are developed. The dimensionless plate velocity spectral density and dimensionless cavity acoustic pressure spectral density were computed, by means of a digital computer, for selected values of dimensionless input parameters. From these computed dimensionless spectra, the effects of major parameters on the plate velocity spectral density and the cavity acoustic pressure spectral density were determined. (Author)
AD-653 455 HC$3.00 MF$0.65

JOURNAL OF PHYSICS, VOL. 21, NO. 5, 1965: SELECTED ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20C.
AD-653 531 HC$3.00 MF$0.65

JUNGLE ACOUSTICS II: LOCALIZATION OF SOUNDS IN THE JUNGLE.
Research rept.,
Army Tropic Test Center Fort Clayton Canal Zone
D. A. Dobbins, and C. M. Kindick. Apr 67, 79p Rept no. RR-9
See also AD-647 804.

Descriptors: (*Acoustics, Jungles), (*Jungles, Sound), Sound transmission, Hearing, Auditory perception, Direction finding, Errors, Tropical regions, Atmospheric temperature, Humidity, wind, Rain.

The US Army Tropic Test Center conducted a study of sound localization in the Canal Zone jungle during December, 1966. Localization errors were high in the jungle. Errors were highest for pure tones, next highest for continuous noises, and lowest for impact noises. Low frequencies were easier to localize than higher frequencies. Distance had a significant influence on the size of the localizing error only if reversal errors were included in means. The size of the localization error was highly dependent on the direction angle of the sound. Constant errors in localizing responses were found; their strength and direction depended strongly on direction angle. Background environmental data are also presented.
AD-653 619 HC$3.00 MF$0.65

MULTIPLE SCATTERING OF ACOUSTICAL WAVES,
California Inst of Tech Pasadena Div of Engineering and Applied Science
David J. McCloskey. May 67, 27p Rept no. 85-40
Contract N00014-67-0094-0009

Descriptors: (*Acoustics, Scattering), Theory, Sound, Propagation, Equations of motion, Integral equations.

The general theory of the multiple scattering of acoustical waves by a random distribution of isotropic point scatterers is considered. Configurational averages are taken of the equations of multiple scattering and integral equations governing these configurational averages are obtained; the physical consequences of these equations are examined in detail. A complete theoretical picture is obtained of the propagation of the coherent and incoherent radiation and the connection between the coherent and incoherent contributions to the average sound intensity and current. (Author)
AD-653 868 HC$3.00 MF$0.65

ABSORPTION PEAK FOR ULTRASONIC WAVES NEAR THE SPIN-FLOP TRANSITION OF UNIAXIAL ANTIFERROMAGNETS,
Massachusetts Inst of Tech Cambridge National Magnet Lab
Y. Shapira. 21 Feb 67, 4p Rept no. JP-239
AFOSR-67-1411
Contract F44620-67-C-0047
Availability: Published in Physics Letters v24A n7 p361-2 Mar 27 1967.

Descriptors: (*Ultrasonic radiation, *Antiferromagnetism), (*Magnetic fields, Absorption), Single crystals, Rotation, Sound, Spin, Propagation, Attenuation, Wave transmission.

An absorption peak for longitudinal and shear ultrasonic waves was observed near the spin-flop transition of (Cr2O3)0.94- (Al2O3)0.06 and of MnF2. (Author)
AD-653 903 Not available from CFSTI.

ACOUSTOELECTRIC OSCILLATIONS, CURRENT SATURATION AND ELECTRON DRIFT MOBILITY IN CADMIUM SULPHIDE CRYSTALS,
Forsvarets Forskningsinstitutt Kjeller (Norway)
For primary bibliographic entry see Field 20L.
AD-654 003 HC$3.00 MF$0.65

SOUND VELOCITY PROFILES BETWEEN BERMUDA AND THE ANTILLES.
Technical rept.,
Woods Hole Oceanographic Institution Mass
R. E. Payne, and J. C. Beckerle. Aug 66, 31p Rept no. WHOI-Ref-66-52
Contracts Nonr-4029 (00), Nonr-2866 (00)

Descriptors: (*Underwater sound, Tables), (*Depth finding, *Atlantic Ocean), Velocity, Measurement, Calibration, Oceanographic data, Deep water, Computer programs, Instrumentation, Oceanographic equipment, Bermuda, Ocean bottom, Puerto Rico.

On Cruise 11 of R/V ATLANTIS II in June, July, and August 1964, seventy sound velocity profiles SVP 211-280, were made over an area between Bermuda and Puerto Rico bounded approximately by 19 degrees - 32N and 65 degrees - 72W. The profiles are presented with some interpretation, and a description of the shipboard equipment and calculation methods is included. (Author)
AD-654 174 HC$3.00 MF$0.65

OPTIMAL ACOUSTIC ENVIRONMENT FOR SPACECRAFT CABINS.
Holman (John F.) and Co., Inc., Washington, D. C.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 15.
N67-28221 HC$3.00 MF$0.65

20B. CRYSTALLOGRAPHY

SPACE-TIME SYMMETRY RESTRICTIONS ON TRANSPORT COEFFICIENTS. II. TWO THEORIES COMPARED,
Massachusetts Inst of Tech Lexington Lincoln Lab
W. H. Kleiner. 9 Feb 66, 3p Rept no. JA-2747
ESD-TR-67-191
Contract AF 19 (628)-5167
Availability: Published in The Physical Review v153 n3 p152-3 Jan 15 1967.

Descriptors: (*Symmetry (Crystallography), Integral equations), (*Magnetic fields, *Electrical conductance), Dynamics, Hall effect, Ferromagnetism, Theory, Spin, Differential equations, Transport properties, Crystal lattices, Single crystals.

The space-time symmetry restrictions on transport coefficients given by two recent theories are compared and the differences are exhibited in detail

for the zero-magnetic-field electrical conductivity. The symmetry restrictions of one of the theories are shown to be inconsistent with the existence of the extraordinary Hall effect in ferromagnets.
AD-653 408 Not available from CFSTI.

ELECTROOPTIC EFFECT IN TRIGONAL SELENIUM AT 10.6 UM,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20F.
AD-653 412 Not available from CFSTI.

THE CRYSTAL STRUCTURE OF THE POTASSIUM ALUMINATE K2 (Al2O (OH)6),
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
Georg Johansson. 22 Oct 65, 13p
AFOSR-67-1310
Contract AF 61 (052)-162
Availability: Published in Acta Chemica Scandinavica v20 p505-15 1966.

Descriptors: (*Potassium compounds, Crystal structure), (*Aluminates, Crystal structure), X-ray diffraction analysis, Crystal lattices, Symmetry (Crystallography), Molecular association, Sweden.
Identifiers: Potassium aluminates.

The structure of the potassium aluminate K2 (Al2O (OH)6) was determined from three-dimensional X-ray data. The symmetry is orthorhombic, the space group is No. 41: Aba2 and the unit cell dimensions are: a = 10.23 A, b = 7.58 A, and c = 10.04 A. The structure contains discrete aluminum-oxygen groups ((OH)3AlOAl (OH)3) (2-) built up from two AlO4 tetrahedra sharing an oxygen. These groups are held together by means of the potassium ions. (Author)
AD-653 421 Not available from CFSTI.

THE CRYSTAL STRUCTURE OF Zr2 (OH)2 (SO4)3 (H2O)4,
Royal Inst of Tech Stockholm (Sweden)
D. B. McWhan, and Georg Lundgren. 5 Aug 65, 9p
AFOSR-67-1309
Contract AF 61 (052)-162
Prepared in cooperation with Bell Telephone Labs., Inc., Murray Hill, N. J., and Gothenberg Univ. (Sweden).
Availability: Published in Inorganic Chemistry v5 n2 p284-9 Feb 1966.

Descriptors: (*Zirconium compounds, *Crystal structure), (*Sulfates, Crystal structure), X-ray diffraction analysis, Crystal lattices, Symmetry (Crystallography), Hydroxides, Hydrates, Molecular association, Salts, Sweden.
Identifiers: Z conium sulfates.

The crystal structure of Zr2 (OH)2 (SO4)3 (H2O)4 was determined from Patterson and Fourier projections and completed by a three-dimensional least-squares refinement. The crystals are monoclinic with a=13.056 plus or minus 0.002 A., b=6.5075 plus or minus 0.0006 A., c=15.092 plus or minus 0.002 A., beta = 96.21 plus or minus 0.01, and Z=4. The data are compatible with space group C2/c. The structure is built up of sheets of zirconium and sulfate ions, and the zirconium ions of adjacent sheets are connected by double hydroxide bridges. The structure may be viewed as being composed of dimers Zr2 (OH)2 (6+). The coordination of zirconium is eightfold with the oxygen atoms forming a dodecahedron with triangular faces (Mo (CN)8 (4-) coordination). The mean Zr-O distance is 2.19 A. The structures and interrelationships of several zirconium basic salts are discussed. (Author)
AD-653 436 Not available from CFSTI.

THE STRUCTURES OF THE Bi-Sn, Bi-Pb AND Bi-Tl EUTECTICS,
Toronto Univ (Ontario) Dept of Metallurgy and Materials Science
For primary bibliographic entry see Field 11F.
AD-653 488 Not available from CFSTI.

CERTAIN CHARACTERISTICS OF A HIGH-FREQUENCY INDUCTION GAS DISCHARGE AND PECULIARITIES OF ITS APPLICATION FOR SYNTHESIS OF REFRACTORY DIELECTRIC CRYSTALS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-653 556 HC$3.00 MF$0.65

LOW TEMPERATURE ABSOLUTE REFLECTION MEASUREMENTS OF SMALL SAMPLES,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20F.
AD-653 673 Not available from CFSTI.

PROPERTIES OF MERCURY CHALCOGENIDES,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20L.
AD-653 688 Not available from CFSTI.

LOW TEMPERATURE CRYSTALLOGRAPHIC AND MAGNETIC STUDY OF LaCoO3.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20L.
AD-653 689 Not available from CFSTI.

CHARACTERIZATION OF d ELECTRONS IN SOLIDS BY STRUCTURE. II. SPONTANEOUS CRYSTALLOGRAPHIC DISTORTIONS,
Massachusetts Inst of Tech Lexington Lincoln Lab
John F. Goodenough. 5 Dec 66, 22p Rept no. MS-1814 (11)
ESD-TR-67-247
Contract AF 19 (628)-5167
Availability: Published in Materials Research Bulletin v2 p165-84 1967.

Descriptors: (*Crystal structure, Electrons), (*Band theory of solids, Crystal structure), Ferroelectric materials, Bismuth compounds, Titanium compounds, Oxides, Semiconductors, Crystal lattice defects.

Spontaneous crystallographic distortions to a lower symmetry phase at lower temperatures may be induced either by localized d electrons or by narrow-band d electrons. Band electrons induce changes in translational symmetry that introduce planes of energy discontinuity at the Fermi surface; localized electrons induce changes in local symmetry that leave the transition-metal cations in the centers of symmetry of their anionic interstices. Ferroelectric and semiconducting equals metallic transitions illustrate distortions induced by collective electrons. It is also shown how the shear structures found in nonstoichiometric, homologous series of transition-metal oxides may be induced by ferroelectric-type distortions. Nonstoichiometric compounds having localized d electrons exhibit ordering of point charges and point defects. Ferroelectric distortions induced by heavy atoms in a lower valence state are also discussed. (Author)
AD-653 691 Not available from CFSTI.

CHEMICAL PHYSICS OF SURFACE REACTIONS OF METALS.
Westinghouse Research Labs Pittsburgh Pa
For primary bibliographic entry see Field 11F.
AD-653 723 HC$3.00 MF$0.65

RELATION OF MECHANICAL PROPERTIES TO THE STRUCTURE OF IONIC SOLIDS.
Quarterly rept. no. 4, 1 Mar-31 May 67,
Pennsylvania State Univ University Park Materials Research Lab
K. Vedam, and V. Vand. 15 Jun 67, 38p
AMRA-CR-66-07/4
Contract DA-19-066-AMC-325 (X)
See also AD-649 351.

Descriptors: (*Mica, Mechanical properties), (*Silicates, *Crystal structure), Crystal lattices, Least squares method, X-ray diffraction analysis, Dislocations, Ceramic materials, Models (Simulations).

The crystal structure analysis and least squares refinement of fluorophlogopite (R-factor = 6.4%) was completed in the centric space group C2/m utilizing Hanson's relative weighting scheme. The interatomic distances and thermal vibration amplitude features of the mica have been determined utilizing these refined parameters. N (Z) tests on the mica intensity data for a center of symmetry suggest the possibility that the material may be noncentric; a study has been started in this respect. The use of absolute, semi-absolute and relative weighting schemes in least squares refinements with anisotropic vibration parameters is discussed with reference to a study on ruby. The Berg-Barrett x-ray technique was successfully employed to delineate the dislocations in the (001) plane of mica. (Author)
AD-653 788 HC$3.00 MF$0.65

HERTZIAN FRACTURE IN SINGLE CRYSTALS WITH THE DIAMOND STRUCTURE,
Brown Univ Providence R I Div of Engineering
B. R. Lawn. May 67, 29p
Contract SD-86

Descriptors: (*Crystallography, *Isotropism), (*Fracture (Mechanics), *Crystal structure), Single crystals, Brittleness, Anisotropy, Theory, Surface properties, Geometry, Stresses, Mechanical properties, Equilibrium, Silicon, Energy, Cracks, Tables.

Extension of an earlier theory of Hertzian fracture in brittle isotropic materials is made to include the case of brittle single crystals. A criterion is first proposed for predicting the path of a crack through an inhomogeneously stressed crystal in terms of the surface energy anisotropy of the crystal and the stresses prior to fracture occurring. This criterion is then applied to determine the geometry of cracks formed in the Hertzian stress field in crystals having the diamond structure. The computed crack geometries agree well with observation. An analysis of the fracture mechanics of crack growth into the crystal subsequently indicates that for a certain range of indenter size the Hertzian crack passes through four equilibrium stages, as it does in glass, before reaching its fully developed length. As a result Auerbach's law holds, i.e. the critical load on the indenter necessary to produce a fully developed Hertzian fracture is proportional to the radius of the indenter. This law is confirmed by Hertzian fracture tests on silicon single crystals. Finally, possible application of the Hertzian test to the study of some mechanical properties, such as fatigue, of brittle single crystals is indicated. (Author)
AD-653 857 HC$3.00 MF$0.65

CRYSTAL CHEMISTRY AT ELEVATED PRESSURE AND MODERATE TEMPERATURES.
Final rept., Sep 58-May 67,
Pennsylvania State Univ University Park Materials Research Lab
Roy Rustum, and Frank Dachille. 31 May 67, 23p
Contract Nonr-655 (20)

Descriptors: (*Crystallography, High-pressure research), Ceramic materials, Semiconductors.

Phase studies, Reaction kinetics, Physical chemistry.

The guidelines and major emphases of the research conducted during the nearly nine year period of support by the Office of Naval Research are summarized. The substantive results were presented at intervals as 22 Technical Reports and 25 publications, plus 4 publications from closely related work branching from this project. A bibliography is included. (Author)
AD-653 887 HC$3.00 MF$0.65

A STUDY OF THE NIOBIUM (110) SURFACE USING LOW ENERGY ELECTRON DIFFRACTION TECHNIQUES,
Aerospace Research Labs Wright-Patterson AFB Ohio
T. W. Haas. 19 May 66, 18p Rept no. ARL-67-0025
Availability: Published in Surface Science v5 p345-58 1966.

Descriptors: (*Niobium, Surface properties), Single crystals, Electron diffraction analysis, Ion bombardment, Argon, Cleaning, Heating, Electron beams, Intensity, Voltage.

A study of the cleaned Nb (110) surface has been conducted. It is found that a clean surface can be produced in a properly oriented sample by heating to 2200C for a short time. Data for intensity vs. voltage for various beams show a great similarity to those obtained for the Mo (110) surface. Faceting due to heating or to argon ion bombardment was not found but probably does occur in the presence of oxygen. (Author)
AD-653 899 Not available from CFSTI.

STACKING FAULT ENERGIES OF THE STRUCTURALLY RELATED Cu-Ga ALPHA AND ZETA PHASES.
Revised ed.,
Mellon Inst Pittsburgh Pa
K. H. G. Ashbee, and L. F. Vassmillet. 27 Jun 66, 7p
AFOSR-67-1404
Grant AF-AFOSR-929-65
Revision of manuscript received 22 Apr 66. Prepared in cooperation with Bristol Univ. (England).
H. H. Willis Physics Labs.
Availability: Published in Acta Metallurgica v15 p481-4 Mar 1967.

Descriptors: (*Crystal lattice defects, *Copper alloys), Gallium alloys, Phase studies, Energy, Dislocations, Electron microscopy.

The interatomic spacings in copper-gallium alpha- and zeta-phase alloys of terminal composition are very nearly identical. Consequently, a Shockley partial shear in both produces stacking faults which maintain close packing and identical first nearest neighbor distances. The only difference between faults in the alpha and zeta phases is the stacking sequence, that is, next nearest neighbor relationships. In spite of this apparent small difference in the nature of the defect, very widely extended stacking faults are observed in the alpha phase but not at all in the zeta phase. The relative specific energies of the two faults are gamma sub-zeta over gamma sub-alpha equals 3.0, and the difference is attributed to the difference in distant neighbor relationships. The absolute magnitude of gamma sub-alpha is so small that intersecting dislocations are unable to constrict and merely cut right through each other. The geometry of this phenomenon is analyzed. (Author)
AD-653 905 Not available from CFSTI.

REMOVAL OF LIQUID INCLUSIONS FROM SOLUTION-GROWN CRYSTALS,
Aerospace Corp El Segundo Calif Labs Div
William R. Wilcox. Apr 67, 29p Rept no. TR-1001 (9230-03)-5
SSD-TR-67-99
Contract AF 04 (695)-1001

Descriptors: (*Crystals, Defects (Materials)), (*Purification, Crystals), Separation, Drying, Diffusion, Liquids, Temperature.

Inclusions are almost invariably present in solution-grown crystals and chemicals. It is shown that a temperature gradient is a practical means of removing the liquid inclusions found in many crystals. Theoretical calculations of travel rates and energies were performed for several materials. The technique was tested experimentally, using several aqueous-grown crystals. Occasionally, inclusions were observed to exit from the cooler, top surface of the crystals, in disagreement with theoretical predictions. This unexpected behavior is probably due to a reflux-extraction mechanism in those inclusions containing both vapor and liquid. Other means of removing inclusions are discussed briefly. (Author)
AD-653 990 HC$3.00 MF$0.65

PROPAGATION OF SOME SYSTEMATIC ERRORS IN X-RAY LINE PROFILE ANALYSIS.
Georgia Inst of Tech Atlanta Engineering Experiment Station
For primary bibliographic entry see Field 12A.
AD-654 052 Not available from CFSTI.

COARTICULATION IN VCV UTTERANCES: SPECTROGRAPHIC MEASUREMENTS,
Royal Inst of Tech Stockholm (Sweden) Speech Transmission Lab
S. E. G. Ohman. 1965, 20p
AFCRL-67-0286
Research supported in part by NIH.
Availability: Published in The Journal of the Acoustical Society of America v39 n1 p151-68 Jan 1966.

Descriptors: (*Acoustics, Spectroscopy), (*Sound, Measurement), Speech, Locus, Physiology, Language, Phonetics, Data, Tables, Volume, Frequency, X rays, Motion picture photography.

In this paper, the formant transitions in vowel + stop consonant + vowel utterances spoken by Swedish, American, and Russian talkers are studied spectrographically. The data suggest a physiological model in terms of which the VCV articulations are represented by a basic diphthongal gesture with an independent stop-consonant gesture superimposed on its transitional portion. This interpretation necessitates a reevaluation of the locus theory proposed by the workers of the Haskins Laboratories. Some conclusions about the general nature of the neural instructions behind the VCV gestures are discussed. (Author)
AD-654 073 Not available from CFSTI.

PRESSURE DEPENDENCE OF DISLOCATION MOBILITY IN ALKALI HALIDE CRYSTALS,
Yale Univ New Haven Conn Dept of Engineering and Applied Science
L. A. Davis, and R. B. Gordon. 31 Jan 67, 6p
AROD-4894:2
Contract DA-31-124-ARO (D)-244
Availability: Published in Applied Physics Letters v10 n6 p173-5 Mar 15 1967.

Descriptors: (*Dislocations, Halides), (*Alkali metal compounds, Halides), Pressure, Stresses, Sodium compounds, Chlorides, Potassium compounds, Lithium compounds, Hydrostatic pressure.

By means of differential pressure compression tests the pressure dependence of the plastic flow stress of NaCl, KCl, and LiF is measured. The measured flow stress change can be related directly to the change in dislocation mobility. In NaCl and KCl, a screw dislocation mobility is decreased under pressure by more than the shear modulus is raised: the effect is nearly zero in LiF. (Author)
AD-654 101 Not available from CFSTI.

ON THE NATURE OF MASSIVE PHASES IN HYPOEUTECTOID Cu-Ga ALLOYS,
Mellon Inst Pittsburgh Pa
For primary bibliographic entry see Field 11F.
AD-654 120 Not available from CFSTI.

MATRIX A FORCE CONSTANT ADJUSTER PROGRAM TO OBTAIN LEAST SQUARES FIT TO OBSERVED FREQUENCIES OF MOLECULES AND CRYSTALS,
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 13.
IN-1077 HC$3.00 MF$0.65

20C. ELECTRICITY AND MAGNETISM

APPLIED RESEARCH IN THIN-FILM FIELD EMISSION TUBES.
Quarterly progress rept., no. 5, 1Oct-31 Dec 63,
Stanford Research Inst., Menlo Park, Calif.
L. N. Heynick, W. W. Hansen, and H. S. Crafts. Jan 64, 26p Rept. no. 18
Contract DA-36-039-AMC-00004 (E)
Continuation of contract DA-36-039-sc-84526.

Descriptors: (*Microminiturization (Electronics), *Field emission), Films, Electron tubes, Vacuum apparatus, Dielectrics, Phosphorescent materials, Diodes, Mass spectroscopy, Electron bombardment, Molybdenum, Aluminum compounds, Oxides.

Experimental work on photon generation by electron bombardment of dielectrics was resumed, for possible application to photon coupling between micron-size devices. Targets of bare molybdenum and aluminum-oxide films on a molybdenum substrate were bombarded with field-emitted electrons from a source spaced in the micron range. For the target configuration studied, the photon generation efficiency was too low to be of practical use, but this result also precludes any difficulty from unwanted photon coupling due to inadvertent electron bombardment of dielectrics. An alternative, simplified procedure for producing interim, operable, micron-size diodes has been formulated, to provide vehicles for encapsulation studies. Experimental work has been started on several phases of this approach. Further developmental work was done on materials evaporation rate-control techniques. Satisfactory operation of a ser :o-control loop, involving an RF heater and a quadrupole mass spectrometer, was achieved, but shielding of the RFheater within the ultra-vacuum chamber is necessary to avoid interference with the spectrometer. (Author)
AD-439 660 HC$3.00

LOW ENERGY QUANTA IMAGE TRANDUCERS USING A CONTROLLED RECOMBINATION MODE,
Aerospace Research Labs Wright-Patterson AFB Ohio
Radames K. H. Gebel. 1966, 24p Rept no. ARL-67-0041
Availability: Published in Advances in Electronics and Electron Physics v22 p189-210 1966.

Descriptors: (*Transducers, *Images), (*Detection, Images), Semiconductors, Modules (Electronics), Photoelectric effect, Energy, Light, Theory, Equations, Sensitivity, Infrared images.

The paper discusses the possibility and the advantages of erasure by using frame-rate controlled recombination of the information carriers, when

employing the internal photoeffect for image detection devices which are able to follow dynamic events at a given rate, instead of erasure of the information carriers by the continuous uncontrolled recombination that occurs in the conventional materials used for such a purpose. Basic equations, which are pertinent to opto-electronic photodetection that utilizes either controlled erasure of the information between consecutive frames or the continuous uncontrolled recombination of the carriers for erasure, are derived, analysed, and compared. (Author)
AD-653 401 Not available from CFSTI.

SPACE-TIME SYMMETRY RESTRICTIONS ON TRANSPORT COEFFICIENTS. II. TWO THEORIES COMPARED,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20B.
AD-653 408 Not available from CFSTI.

ON THE NATURE OF CHARGE-CARRIERS IN LIQUID Se CONTAINING Cl,
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
For primary bibliographic entry see Field 7D.
AD-653 431 Not available from CFSTI.

DEGAUSSING COIL INTERFERENCE.
Research and development rept.,
Navy Marine Engineering Lab Annapolis Md
C. C. Fennell, D. M. Peoples, and L. T. Dunnington. Mar 67, 35p Rept no. MEL-297/66

Descriptors: (*Degaussing, *Interference), Ship hulls, Ferromagnetic materials, Magnetic fields, Steel, Magnetic mines, Instrumentation, Theory, Mathematical analysis, Coils, Deflection, Intensity, Digital computers, Air, Measurement, Naval vessels (Support), Naval vessels (Combatant), Data.

Because of their ferromagnetic properties, steel-hulled ships distort the ordinar ly uniform earth's magnetic field. To avoid detection by magnetically-triggered mines, naval vessels have installed degaussing coils to generate magnetic fields opposing this distortion. The degaussing coils are arranged to compensate for the ship's influence and restore a relatively uniform field some distance beneath the water surface. Certain shipboard instrumentation can be seriously affected by these degaussing coil fields. To alleviate this problem, shipboard locations exhibiting low degaussing coil field strengths should be predetermined to ensure a safe environment for such sensitive instruments. Initially the degaussing coil system was simulated by a digital computer for the purpose of computing system magnetic field values for the air-core case (excluding effects of ferromagnetic material). A least mean square method was used to ascertain the degree to which air-core data could be used to predict the actual shipboard values. Results of this analysis indicate that shipboard magnetic fields cannot be predicted to any useful degree of accuracy by means of simple proportionality with the air-core data. (Author)
AD-653 450 HC$3.00 MF$0.65

PHOTOCURRENTS AT A METAL-ELECTROLYTE INTERFACE.
New York Univ N Y Dept of Chemistry
For primary bibliographic entry see Field 7E.
AD-653 453 Not available from CFSTI.

IONIC THERMOCURRENTS IN DIELECTRIC SOLIDS,
Milan Univ (Italy) Istituto Di Fisica
C. Bucci, R. Cappelletti, R. Fieschi, G. Guidi, and L. Pirola. 7 May 66, 25p
AFOSR-67-1333
Grant AF-EOAR-7-65
Availability: Published in Supplemente al Nuovo Cimento v4 Ser1 p607-29 1966.

Descriptors: (*Ionic current, *Thermal properties), (*Dielectric properties, *Solids), Halides, Entropy, Crystal lattice defects, Polarization, Atomic properties, Crystals, Atomic structure, Thermodynamics, Low-temperature research.

Consideration is given mainly to the dipolar polarization due to lattice imperfections, because this subject provides much valuable information on the atomic structure and properties of real crystals. We summarize some of the most significant results. When the crystals, either pure or containing divalent impurities, contain only F-centres, very small changes are measured in the I.T.C. spectra with respect to the noncoloured crystals. Significant modifications are in general detected in the I.T.C. after irradiation with F-light, and the changes are different for different temperatures of illumination. (Author)
AD-653 489 Not available from CFSTI.

THREE-PHOTON PHOTOELECTRIC EFFECT IN GOLD,
Cornell Univ Ithaca N Y Lab of Atomic and Solid State Physics
E. M. Logothetis, and P. L. Hartman. 6 Mar 67, 3p Rept no. TR-11
Contract Nonr-401 (47)
Research supported in part by ARPA, rept. no. 648.
Availability: Published in Physical Review Letters v18 n15 p581-3 Apr 10 1967.

Descriptors: (*Gold, Photoelectric effect), Lasers, Ruby, Photons, Work functions, Photoelectric cells (Semiconductor), Films.

An observation and study was made of a three-photon photoelectric effect in gold at room temperature using a Q-switched ruby laser (photon energy 1.786 eV).
AD-653 490 Not available from CFSTI.

JOURNAL OF PHYSICS, VOL. 21, NO. 5, 1965: SELECTED ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
Lan Sin-fu, Wei Yung-chio, and Chang Sue-I. 20 Dec 66, 69p Rept no. FTD-HT-66-531
TT-67-62106
Edited trans. of Wu Li Hsueh Pao (Chinese People's Republic), v21 n5 p15-37, 1061-74 1965.

Descriptors: (*Germanium, Magnetic fields), (*Ultrasonic radiation, Liquids), Resistance (Electrical), Phonons, Scattering, Transport properties, China, Interferometers, Ultrasonic properties, Absorption, Bessel functions.
Identifiers: Magnetoresistive effect.

Contents: The transverse magnetoresistance of n-type germanium in a strong magnetic field; Ultrasonic absorption in aqueous suspension.
AD-653 531 HC$3.00 MF$0.65

HALL EFFECT IN CHANNEL WITH SECTIONALIZED ELECTRODES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 9A.
AD-653 542 HC$3.00 MF$0.65

RESEARCH ON STRIPE DOMAIN STRUCTURES IN FERROMAGNETIC METAL FILMS.
Franklin Inst Research Labs Philadelphia Pa
For primary bibliographic entry see Field 11G.
AD-653 601 HC$3.00 MF$0.65

LOW ENERGY ELECTRONS ON A FIELD LINE WITH A POTENTIAL MINIMUM,
Pennsylvania State Univ University Park Ionosphere Research Lab
For primary bibliographic entry see Field 20H.
AD-653 639 HC$3.00 MF$0.65

LOW TEMPERATURE CRYSTALLOGRAPHIC AND MAGNETIC STUDY OF LaCoO3.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20L.
AD-653 689 Not available from CFSTI.

PHOTON-ENHANCED FIELD EMISSION FROM CdS SINGLE CRYSTALS,
Oxford Univ (England) Dept of Engineering Science
Saiyed Abram Husain, and Don Walsh. 22 Feb 67, 4p
AFOSR-67-1383
Grant AF-EOAR-37-65
Availability: Published in Electronic Letters v3 n3 Mar 1967.

Descriptors: (*Field emission, *Cadmium sulfides), Single crystals, Lasers, Argon, Illumination, Vacuum.

In a previous experiment, field emission was observed from sharply pointed CdS single crystals. The experiments have now been extended, illuminating the tip with light from a pulsed argon-ion laser. It was found that (a) the voltage threshold at which emission can be observed is reduced, typically from 500 to 400 V, (b) under some conditions, the emission is increased by a factor of 1000, (c) this emission persists for more than 200s after the laser pulse and appears to have two characteristic decay times, (d) the emission is approximately proportional to the light intensity and (e) the greatest photo-enhanced field emission was obtained with the laser light shining axially on the emitting area of the tip. (Author)
AD-653 816 Not available from CFSTI.

PHOTOEMISSION FROM SOLID XENON FILMS,
Rochester Univ N Y Inst of Optics
John F. O'Brien, and K. J. Teegarden. 1966, 2p
AFOSR-67-1387
Grant AF-AFOSR-236-65
Availability: Published in Proceedings Am. Phys. Soc. Wash. D.C. Apr 25 1966.

Descriptors: (*Photoelectric effect, Xenon), (*Xenon, Films), Cryogenics, Measurement, Excitons, Band theory of solids, Electrons.

Measurement of the intrinsic photoelectric yield has been made for solid xenon films at 20 degrees K. These measurements were carried out as a function of photon energy from 7.5 to 11.7 ev. Structure appears in the emission which can be associated with both exciton and interband transitions. The yield rises sharply at 9.7 ev reaching a value of about 0.1 at 10.5 ev. Below 9.7 ev the yield is less than 0.005, with maxima at the position of known exciton l nes. In films annealed at 55 degrees K, the exciton peaks are shifted to lower energies and the threshold at 9.7 ev becomes steeper. If the threshold at 9.7 ev is assumed to result from transitions to states above the vacuum level, the electron affinity must be less than 0.4 ev. This assumes the band gap of solid xenon is 9.3 ev, as suggested by Baldini. Measurements of the energy distribution of the emitted electrons are presently underway to determine more about the band structure of this simple solid. (Author)
AD-653 825 Not available from CFSTI.

HIGH TEMPERATURE HALL EFFECT IN CUPROUS OXIDE,
Arizona State Univ Tempe Dept of Chemistry
H. L. McKinzie, and M. O'Keefe. 29 Dec 66, 5p
AFOSR-67-1392

Grant AF-AFOSR-719-65
Availability: Published in Physics Letters v24A n3 p137-8 Jan 30 1967.

Descriptors: (*Hall effect, Copper compounds), Single crystals, Semiconductors, High-temperature research, Electrical properties, Conductivity, Band theory of solids.

The Hall Effect has been measured in single crystals of cuprous oxide from room temperature up to 750C. The Hall coefficient changes sign at 450C and is positive below this temperature and negative at the higher temperatures. The results indicate that (a) the majority of the cation vacancy acceptors are not ionized even at the highest temperatures and (b) that electron mobility is considerably greater approximately 100 cm sq./V sec than hole mobility approximately 7 cm sq./V sec at high temperatures (800 degrees C). (Author)
AD-653 831 Not available from CFSTI.

ABSORPTION PEAK FOR ULTRASONIC WAVES NEAR THE SPIN-FLOP TRANSITION OF UNIAXIAL ANTIFERROMAGNETS,
Massachusetts Inst of Tech Cambridge National Magnet Lab
For primary bibliographic entry see Field 20A.
AD-653 903 Not available from CFSTI.

THE RESONANCE FREQUENCY OF AN ANISOTROPIC FERROMAGNET.
Research trans,
Emmanuel Coll Boston Mass Oriental Science Library
Suen Shin. Apr 67, 19p Rept no. Emm-66-126 TT-67-62151
Contract AF 19 (628)-5073
Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v21 n10 p1776-84 1965.

Descriptors: (*Ferromagnetism, *Resonant frequency), Anisotropy, Rotation, Magnetic properties, Green's function, Equations, Hamiltonian, Magnetic fields, Crystal structure, China.

The magnetization and resonance frequency of an anisotropic ferromagnet are calculated by the method of rotation of the coordinate system. The relation between the resonance frequency and the exchange interaction tensor is derived, from which and from the resonance data obtained experimentally the direction of the principal axes and the principal values of the exchange interaction may be determined. (Author)
AD-653 969 HC$3.00 MF$0.65

FARADAY UNIPOLAR INDUCTION IN A NONIDEAL TYPE II SUPERCONDUCTOR,
Aerospace Corp El Segundo Calif Labs Div
M. A. R. Le Blanc, and E. L. Fletcher. Apr 67, 18p Rept no. TR-1001 (9230-01)-5 SSD-TR-67-94
Contract AF 04 (695)-1001

Descriptors: (*Superconductors, Inductance), (*Niobium, Superconductivity), Generators, Electrical impedance, Cryogenics, Rods.

A Faraday unipolar inductor using a solid cylinder of a nonideal type II superconductor (unannealed Nb) constitutes a zero internal impedance generator capable of supplying appreciable electrical power and permits continuous study of the behavior of the average internal magnetic field vs the applied field. The various contributions to the observed emf are discussed in terms of the relativistic interpretation of Faraday unipolar induction. (Author)
AD-653 989 HC$3.00 MF$0.65

MICROWAVE PROPERTIES OF THIN FERRITE FILMS,
Polytechnic Inst of Brooklyn N Y Microwave Research Inst
For primary bibliographic entry see Field 7D.
AD-653 998 HC$3.00 MF$0.65

A STUDY OF THE INTRODUCTION OF IONS INTO THE REGION OF STRONG FIELDS WITHIN A QUADRUPOLE MASS SPECTROMETER QUARTERLY PROGRESS REPORT, 17 MAY - 17 AUG. 1966.
Bell and Howell Research Center, Pasadena, Calif.
W. M. Brubaker. 17 Aug 66, 31p NASA-CR-79170, QPR-4
Contract NASW-1298

Descriptors: *Ion injection, *Mass filter, *Quadrupole, Amplitude, Computer, Electrode, Energy, Field, Filter, Injection, Ion, Mass, Perturbation, Potential, Spectrometer, Trajectory.

For abstract, see STAR 05 15.
N67-28361 HC$3.00 MF$0.65

20D. FLUID MECHANICS

KINETIC METHODS AND THE FREE EXPANSION PROBLEM,
Geophysics Corp. of America, Bedford, Mass.
E. T. Florance. 15 Nov 62, 38p Scientific-7, GCA-TR-62-23-A AFCRL-62-1086
Contract AF 19 (628)-231, ARPA Order-258-61

Descriptors: (*Superaerodynamics, *Kinetic theory), Knudsen number, Boundary layer transition, Approximation (Mathematics), Equations, Distribution functions.

An investigation is made in this report of various techniques used to treat rarefied gases by means of kinetic theory. Two formal parametric expansions, the Chapman-Enskog procedure and Knudsen iteration, are reviewed as applied to the single relaxation time (Krook) model. A brief presentation of the Grad moment method is given, and the thirteen-moment equations are discussed. The Krook model is formally solved, and the solution is compared with the result of the Chapman-Enskog procedure. An approximation method is suggested to account for the existence of a time-like boundary layer in solutions of the kinetic equation. The free expansion of a gas is considered, and two well-known exact solutions for the Euler and Knudsen limits are quoted. Interpolation formulas are constructed to connect exact solutions for both limits through the entire range of Knudsen number. The possibility of incorporating kinetic effects into the known solutions by using other methods is also discussed. (Author)
AD-291 772 HC$3.00

INCOMPRESSIBLE FLOW IN CONICAL DIFFUSERS.
Technical rept.,
Purdue Research Foundation, Lafayette, Ind.
Alan T. McDonald, and Robert W. Fox. Sep 64, 206p TR-1 AROD-4332:1
Contract DA-31-124-ARO (D)-138

Descriptors: (*Incompressible flow, *Diffusers), Design, Aircraft, Centrifugal compressors, Pressure, Kinetic energy, Velocity, Fluid flow, Boundary layer.

There is a difinite engineering need for the capability of designing an efficient flow expansion. Many applications of diffusers are found in practical fluid systems where a need exists to efficiently decrease the kinetic energy of the flow. In automotive and aircraft air handling systems, inlets must be followed by diffusers to decelerate the flow and to provide a uniform stream for the next component. Axial flow and centrifugal compressors are examples of fluid machinery where energy is added to the fluid by increasing its velocity. To recover the maximum amount of this energy it is necessary to decelerate the fluid efficiently. Although flows in adverse pressure gradients have been the subject of a great deal of research, at present there is no reliable way to analytically predict either the behavior of a turbulent boundary layer in an adverse pressure gradient or the performance of a diffusing passage. (Author)
AD-448 505 HC$3.00

NEARLY-FREE MOLECULAR FLOW: A COMPARISON OF THEORY AND EXPERIMENT,
California Univ., Berkeley. Inst. of Engineering Research.
F. S. Sherman, D. R. Willis, and G. J. Maslach. 15 Oct 64, 27p AS-64-16
Contract Nonr-222 (45)

Descriptors: (*Molecular properties, *Drag), (*Mathematical analysis, *Theory), Molecular energy levels, Kinetic energy, Experimental data, Tests.

Measured drag coefficients for cylinders, normal strips and spheres in nearly free-molecular flow at M = 6, 8 and 10 are correlated with a collision-rate parameter suggested by the modified Krook model, and compared with theoretical estimates based on a variety of kinetic models and methods of analysis. The comparison of theory and experiment and the comparative effectiveness of various rarefaction parameters are discussed, and suggestions for further experimentation are made. (Author)
AD-456 356 HC$3.00

SURFACE-ENERGY TENSORS,
Chicago Univ Ill Dept of Physics
For primary bibliographic entry see Field 20H.
AD-653 440 Not available from CFSTI.

ONE-DIMENSIONAL UNSTEADY FLOW OF A RADIATING GAS.
Research rept.,
Polytechnic Inst of Brooklyn N Y Dept of Aerospace Engineering and Applied Mechanics
Ephraim L. Rubin, Chester Gerstenbluth, and Prem K. Khosla. May 67, 19p PIBAL-990
Contract Nonr-839 (34)

Descriptors: (*Gas flow, One-dimensional flow), Stability, Shock waves, Thermal radiation, Propagation, Integral equations, Differential equations.

The unsteady hydrodynamical equations are solved for a radiating gas, using a Lax-Wendroff type technique which is second-order accurate. (Author)
AD-653 443 HC$3.00 MF$0.65

THE ACOUSTIC FIELD IN A CLOSED SPACE BEHIND A RECTANGULAR SIMPLY SUPPORTED PLATE EXCITED BY BOUNDARY LAYER TURBULENCE,
Navy Underwater Sound Lab New London Conn
For primary bibliographic entry see Field 20A.
AD-653 455 HC$3.00 MF$0.65

IRROTATIONAL FLOW OF FRICTIONLESS FLUIDS, MOSTLY OF INVARIABLE DENSITY.
Research and development rept.,
David Taylor Model Basin Washington D C
Earle H. Kennard. Feb 67, 438p Rept no. DTMB-2299

Descriptors: (*Fluid flow, Reviews), Friction, Hydrodynamics, Equations of motion, Two-dimensional flow, Mathematical analysis, Transformations (Mathematics), Cylindrical bodies, Airfoils,

Three-dimensional flow, Inertia, Vortices, Jets, Rotation.
Identifiers: Irrotational flow.

The book treats the known types of the potential flow of frictionless fluids having a uniform and invariable density. The main topics are: fundamentals of the irrotational flow of frictionless fluids; the use of complex functions in hydrodynamics; cases of two-dimensional flow - specific subjects treated are simple flow, line singularities, transformations, forces on cylinders, airfoil theory, rotating boundaries, flow in channels and free streamlines; cases of three-dimensional flow; coefficients of inertia. (Author)
AD-653 463 HC$3.00 MF$0.65

AXISYMMETRIC VISCOUS INTERACTION WITH SMALL VELOCITY SLIP AND TRANSVERSE CURVATURE EFFECTS,
Naval Academy Annapolis Md Dept of Engineering
David F. Rogers. Jun 67, 216p Rept no. USNA-E-67-2

Descriptors: (*Axially symmetric flow, *Aerodynamics), (*Fluid flow, Viscosity), Shock waves, Boundary layer, Partial differential equations, Asymptotic series, Conical bodies, Heat transfer, Skin friction, Hypersonic flow, Interactions, Velocity, Perturbation theory, Boundary value problems.

The flow about an unyawed cone is considered for the hypersonic moderately low density regime. The shock wave boundary layer interaction is considered in the context of the hypersonic strong interaction approximation. Small transverse curvature and small surface slip effects are considered as perturbations on the basic strong interaction solution. Solutions of the governing two-point boundary value problems are obtained by reduction to a system of ordinary differential equations using double asymptotic expansions in a slip parameter and a hypersonic transverse curvature parameter which is proportional to M2 times the Probstein and Elliott transverse curvature parameter. This implies an additional restriction on the transverse curvature solutions in the hypersonic flow regime. The effect of the self-induced pressure gradient is to increase the skin friction and heat transfer rate at the wall. The first-order slip effect increases the boundary layer mass flow and heat transfer rate. Skin friction surface pressure and displacement thickness are increased for wall-to-stagnation temperature ratios <0.30 and decreased for wall-to-stagnation temperature ratios >0.30. The first-order transverse curvature effect decreases the boundary layer mass flow rate, surface pressure, and displacement thickness, whereas the skin friction and wall heat transfer rate are increased.
AD-653 467 HC$3.00 MF$0.65

PHYSICAL GAS DYNAMICS, HEAT TRANSFER AND THERMODYNAMICS OF HIGH TEMPERATURE GASES: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
28 Mar 67, 31p Rept no. FTD-MT-65-552
TT-67-62101
Edited machine trans. of mono. Fizicheskaya Gazodynamika Teploobmen i Termodinamika Gazov Vysokikh Temperatur, n.p., 1964 p29-33; 104-114.

Descriptors: (*Plasma medium, Propagation), (*Gas flow, Photographic analysis), (*Thermodynamics, Gas flow), Heat transfer, Shock waves, Electrons, Physical properties, Interferometers, High-temperature research, Shock tubes, USSR.

Concentration of free electrons and number of collisions of electrons with molecules were calculated in order to find electrophysical parameters of plasma after a shock wave in air. Methodological questions of interferometric investigations in a shock tube created in the laboratory are described. The interferometric method of investigation of high temperature gas flows permitted the authors to obtain distribution of density in flows of constant composition. An interferometer of Mach-Zender type was used. Methods of photographic recording of interference pattern were described. Processing of interferograms was discussed.
AD-653 513 HC$3.00 MF$0.65

HALL EFFECT IN CHANNEL WITH SECTIONALIZED ELECTRODES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 9A.
AD-653 542 HC$3.00 MF$0.65

CONCERNING THE PROBLEM OF THE FLOW OF A HYPERSONIC STREAM OF GAS AROUND A THIN BODY,
Foreign Technology Div Wright-Patterson AFB Ohio
N. M. Monakhov. 23 Jan 67, 12p Rept no. FTD-HT-66-411
TT-67-62108
Unedited rough draft trans. of Aviatsionnyi Institut, Kazan. Trudy (USSR) n71 p50-5 1962.

Descriptors: (*Hypersonic flow, *Slender bodies), Mach number, Boundary value problems, Shock waves, Equations, USSR.

The hypersonic flow of an ideal gas over slender bodies is discussed. The flow Mach number is assumed to be infinite and is directed along the x-axis. Nondimensional coordinates are introduced, and a boundary value problem is obtained in nondimensional form.
AD-653 547 HC$3.00 MF$0.65

AN APPROXIMATE SOLUTION OF VON MISES' BOUNDARY LAYER EQUATION,
New York Univ N Y
Adolfo Reggiori. Mar 67, 34p
ARL-67-0052
Contract AF 33 (615)-2215

Descriptors: (*Laminar boundary layer, Shear stresses), Partial differential equations, Approximation (Mathematics), Fluid flow, Compressible flow, Incompressible flow, Pressure.
Identifiers: Von Mises relation.

A method to compute the shear stress in a laminar boundary layer is presented. The Von Mises' equation is linearized by the substitution of the non linear term with a suitable function. The resulting equation is the well known heat conduction equation, which can be solved in close form to give the shear stress. The application of the method is limited to the case of zero pressure gradient. The corresponding linearizing function is determined by comparison with the exact Blasius solution. The method is then applied to the computation of the shear stress downstream of three different velocity profiles and the results are compared to the solutions obtained by a numerical method. (Author)
AD-653 586 HC$3.00 MF$0.65

AN EXPERIMENTAL STUDY OF SUPERSONIC FLOW OVER A REARWARD FACING STEP.
Revised ed.,
Aerospace Research Labs Wright-Patterson AFB Ohio
Max G. Scherberg, and Howard E. Smith. 11 Aug 66, 10p Rept no. ARL-67-0031
Doctoral thesis Revision of manuscript received 25 Apr 66.
Availability: Published in AIAA Journal v5 n1 p51-6 Jan 1967.

Descriptors: (*Supersonic flow, Pressure), Base flow, Flow fields, Supersonic characteristics, Mach number, Flow separation, Reynolds number, Shock waves, Israel.

Some of the results of an experimental investigation of the flow pressure structures of a supersonic flow over a rearward facing step are presented. The results show that the pressure changes from freestream pressure to base pressure are linear functions of freestream pressure for each Mach speed and step height; the corner expansion fan is not the linear Prandtl-Meyer fan; the separation (lip-shock) shock emerging from the separated shear layer may not be neglected in such flows; base pressures influence the flow upstream of the corner so that conventional considerations about the boundary layer arriving at the corner are questionable; and the Reynolds number based on the step height appears to be important. Some typical shadowgraph pictures and data studies representing the referred to flow structures are presented. Also presented is a preliminary study of the separation shock structure. (Author)
AD-653 654 Not available from CFSTI.

THE EFFECT OF WALL TEMPERATURE ON THE LOW REYNOLDS NUMBER HYPERSONIC STAGNATION REGION SHOCK LAYER.
Revised ed.,
Princeton Univ N J Gas Dynamics Lab
J. T. C. Liu. 18 Mar 66, 16p
ARL-67-0076
Contract AF 49 (638)-1271
Prepared in cooperation with Brown Univ., Providence, R. I.
Availability: Published in International Journal of Heat and Mass Transfer v10 n1 p83-95 1967.

Descriptors: (*Shock waves, Thermodynamics), (*Hypersonic flow, *Stagnation point), Reynolds number, Walls, Temperature, Wake, Mathematical analysis.

The effect of wall temperature on the behavior of the hypersonic stagnation region shock layer in incipient merged layer flow is described. The enthalpy function profile across the shock layer is obtained. The shock detachment distance is shown to be subjected to the compensating corrections of an 'inflow' effect due to velocity slip and an 'outflow' effect due to temperature jump, with the main contribution coming from the over-all density decrease due to wall heating. The net corrections render the shock detachment distance to remain relatively constant with K sq. for a fixed wall temperature, where K sq. is the rarefaction parameter. The ratio of heat flux behind the shock wave to that at the wall is shown to be independent of the wall temperature and is essentially the same as the corresponding ratio when slip effects are absent. (Author)
AD-653 659 Not available from CFSTI.

AERODYNAMICS OF OSCILLATING DISKS AND A RIGHT-CIRCULAR CYLINDER,
Michigan Univ Ann Arbor Dept of Aerospace Engineering
W. W. Willmarth, N. E. Hawk, A. J. Galloway, and F. W. Roos. 30 Nov 65, 36p
ARL-67-0084
Contract AF 33 (616)-7628
Availability: Published in Journal Fluid Mech v27 Pt1 p177-207 1967.

Descriptors: (*Disks, Aerodynamic characteristics), (*Cylindrical bodies, Aerodynamic characteristics), Oscillation, Aerodynamics, Frequency, Moments, Turbulence, Wake, Flow fields, Vortices.

Detailed studies are reported of the free and forced oscillation of disks and a right-circular cylinder constrained to rotate about a fixed diametrical axis passing through the centre of the body and normal to the free-stream direction. When a disk is free to rotate, it oscillates at a definite frequency with slowly varying amplitude and phase. A right-circu-

lar cylinder also oscillates at a definite frequency but with rapidly increasing amplitude. When the amplitude becomes large, after a few cycles of oscillation, the cylinder rotates steadily in one direction. Analogue computer elements, position sensors and a dynamic moment balance were used to study the static restoring moment, dynamic restoring moment, average damping moment, statistical properties of the disk motion and power spectrum of the turbulent moment. The behaviour of the disk and cylinder are explained using the measurements and the theory for random excitation of a linear system. The turbulent exciting moment is caused by the unsteady flow in the wake and can be changed by placing disks and splitter plates in the wake. A model is proposed for the unsteady flow field in the wake behind the disk. The model relates the turbulent moment to the vortex shedding process in the wake. (Author)
AD-653 662 Not available from CFSTI.

ATTENUATION OF A SHOCK WAVE DUE TO THE NONEQUILIBRIUM IONIZATION AND RADIATION.
Revised ed.,
General Dynamics/Convair San Diego Calif
Jan Rosciszewski. 3 Nov 66, 7p
AFOSR-67-1318
Contract AF 49 (638)-1556
Revision of manuscript submitted 7 Apr 66.
Availability: Published in The Physics of Fluids v10 n2 p269-73 Feb 1967.

Descriptors: (*Shock waves, Attenuation), Ionization, Nonequilibrium flow, Equations of motion, Thermal radiation, Energy, Magnetic fields.

The influence of nonequilibrium ionization and radiation on the flow generated by a strong shock wave is discussed. Particularly, the shock wave attenuation is calculated using linearized theory, assuming the degree of ionization to be much less than one. (Author)
AD-653 679 Not available from CFSTI.

LABORATORY STUDY OF SEICHING INDUCED ON AN OFFSHORE SHELF.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 13J.
AD-653 711 HC$3.00 MF$0.65

CAVITY SHAPES AT VERTICAL WATER ENTRY, A COMPARISON OF CALCULATED AND OBSERVED SHAPES,
Naval Ordnance Plant Alexandria Va
For primary bibliographic entry see Field 16B.
AD-653 717 HC$3.00 MF$0.65

SCATTERING OF SURFACE WAVES BY SUBMERGED CIRCULAR CYLINDERS. PART II. SCATTERING BY AN INFINITE ARRAY OF CYLINDERS.
Technical rept.,
Stanford Univ Calif Dept of Mathematics
Jon T. Schnute. 14 Jun 67, 61p Rept no. TR-11
Contract Nonr-225 (74)
See also AD-647 081.

Descriptors: (*Water waves, Scattering), (*Cylindrical bodies, Underwater), Boundary value problems, P opagation, Integral equations, Green's function, Separation.

The paper deals with progressive surface wave motions of a small amplitude and time-periodic nature in an ideal fluid which contains an infinite submerged array of parallel and identical circular cylinders. Their characterization is sought in the framework of a homogeneous linear boundary value problem for harmonic functions which exhibit a common phase shift (that plays the role of an eigenvalue) for any displacement along the direction of wave propagation with a magnitude equal to the separation between adjacent cylinders. An equivalent integral equation is formulated and reduced to an infinite homogeneous linear system from which there obtains a determinantal condition that specifies the dependence of the eigenvalue, or effective wave number, on the frequency, gravitation constant, and geometric parameters. Approximations to the eigenvalue are calculated for any fixed wave length when (1) the radius of the cylinders is small compared with their spacing or (2) their separation distance is large with respect to the radius and depth of immersion. (Author)
AD-653 752 HC$3.00 MF$0.65

HIGH ALTITUDE ROCKET PLUME STRUCTURE.
Final rept., Dec 64-Jun 65,
General Dynamics/Convair San Diego Calif
J. R. Barthel, J. J. Brainerd, R. S. Janda, M. S. Schoonover, and J. A. L. Thomson. Sep 65, 195p
Rept no. GD/C-DBE65-023
Contract Nonr-4747 (00), ARPA Order-562

Descriptors: (*Exhaust gases, Flow fields), Electron density, Shock waves, High altitude, Ionosphere, Exhaust nozzles, Terrestrial magnetism, Rocket motors (Liquid propellant), Numerical analysis, Viscosity, Ions.

A calculation of the flow field in the vicinity of a liquid-fueled rocket travelling through the ionosphere is described. A finite difference program is used to obtain both inviscid and viscous approximations to the exhaust and air flow field. The subsonic nose region is treated by an approximate procedure. Viscous effects are included in the so-called merged layer regime. Numerical calculations of the neutral flow field in the viscous layer approximation are presented for the flow at 180 km. The influence of the geomagnetic field on the motion of the ions is significant at altitudes above about 150 km. Simplified geometries are used to study the ion motion. At low altitudes (below about 150 km) the ion move with the neutrals. At high altitudes (above 250 km) the ions are more or less constrained by the geomagnetic field to a one-dimensional motion along the field lines except in a region relatively close to the missile where the density is sufficiently high to sweep the ions across the field lines. The mechanisms describing the motion of the ions across the field lines are examined in various limiting cases. (Author)
AD-653 769 HC$3.00 MF$0.65

SOLUTION OF THE TWO-SIDED CAUCHY PROBLEM FOR AN m-DIMENSIONAL GENERALIZED ACOUSTIC SYSTEM,
Ballistic Research Labs Aberdeen Proving Ground Md
Abdul R. Kiwan. May 67, 24p Rept no. BRI-1364

Descriptors: (*Fluid flow, Mathematical analysis), Partial differential equations, Initial value problems, Integral equations, Equations of motion, Theorems.

J. B. Diaz and R. Landshoff gave closed form solution of the initial-value problem for an acoustic system in two dimensions. A. R. Kiwan gave the solution of the same problem in two and three space dimensions, and improved the results of Diaz-Landshoff. The present report solves the problem for m-dimensions and deduces the earlier results as special cases. (Author)
AD-653 789 HC$3.00 MF$0.65

SEPARATED FLOWS, A ROUND TABLE DISCUSSION,
Advisory Group for Aerospace Research and Development Paris (France)
Jean J. Ginoux. May 66, 30p Rept no. AGARD-548
NATO furnished.

Descriptors: (*Flow separation, Symposia), Stability, Boundary layer, Turbulence, Reynolds number, Aerodynamic characteristics.

The topics discussed were focused around the following questions: (1) How steady is the separation and reattachment process and how far should theories take account of possible unsteadiness; (2) How valid are the approximations inherent in the boundary layer equations in regions of separation and reattachment; (3) What work is in progress on the turbulent mixing coefficient and how useful or even valid is the concept of such a coefficient; (4) What are the more promising developments in methods for tackling the reattachment problem, and what are the main theoretical and experimental difficulties; (5) What are the factors that limit the present understanding of the effects of Reynolds number on base pressure.
AD-653 841 HC$3.00 MF$0.65

CONVECTIVE ELEMENTS.
Washington Univ Seattle Dept of Atmospheric Sciences
For primary bibliographic entry see Field 4A.
AD-653 849 HC$3.00 MF$0.65

DARE SUPPORT PACKAGE,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 9B.
AD-653 854 HC$3.00 MF$0.65

SYNOPSIS OF A THEORY FOR SHOCK IMPEDANCE EFFECTS IN A ROUGH-WALLED TUNNEL.
Research paper,
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
Francis B. Porzel. May 67, 45p Rept no. RP-P-306
IDA/HQ-67-5809
Contract DAHC15-67-C-0011

Descriptors: (*Shock waves, Damping), (*Underground structures, Explosion effects), Blast, Control, Propagation, Walls, Surface roughness, Theory, Nuclear explosions, Pressure, Attenuation.

The paper postulates five related impedance mechanisms that control the propagation of blast wave through a rough-walled tunnel: entry diffraction, build-up, turbulent choke, wall roughness, and feedback. These combined impedance mechanisms from rough walls rapidly reduce tunnel overpressures down to structurally manageable levels (approx. = 1 bar) within the first few dozen lengths L/D, almost independently of surface pressure near the entry. A relatively slow decrease in tunnel pressures occurs beyond L/D = 50 or at low pressures (< 1 bar). Excellent correlation--within 20 percent--is found with measurements made in rough-walled shock tubes. A program in simple BASIC machine language (suitable for time-sharing teletype) summarizes the calculations, permits the user to input any surface pressure and wall roughness desired, and prints an annotated tabular history of shock pressure down the tunnel. Classic idealizations, such as one-dimensional analyses, or experiments close to the entrance of a smooth-walled tunnel are not considered usually relevant to these phenomena. (Author)
AD-653 860 HC$3.00 MF$0.65

TRANSIENT TEMPERATURE DISTRIBUTION IN A SOLID SPHERE DUE TO AERODYNAMIC HEATING,
Polytechnic Inst of Brooklyn N Y Dept of Aerospace Engineering and Applied Mechanics
Robert N. Coppolino, and S. V. Nardo. Jun 67, 34p
PIBAL-934
Contract Nonr-839 (23)

Descriptors: (*Spheres, *Aerodynamic heating), Temperature, Distribution, Surface temperatures, Heat flux, Differential equations, Solids.

A solid or thick-walled spherical body of low-conductivity material is analyzed for the transient temperature distribution immediately after the application of axisymmetric aerodynamic heating and before the onset of sublimation at the heated surface. The problem of temperature determination is complicated by the fact that the heat flux across the heated surface in the case of aerodynamic heating is a function of the unknown surface temperature. Moreover, the heat flux, even if already known, is a non-separable function of time and meridianal location. The heat conduction equation is therefore solved approximately by the use of an extended Goodman heat balance integral technique which is completely analogous to the Karman-Pohlhausen integral method for boundary layer analysis. The technique reduces a second order partial differential equation to a first-order nonlinear differential equation which is readily integrated. The approximate solution to the reduced problem of heat conduction with point-symmetric aerodynamic heating is compared with a known exact solution and it is found that there is excellent agreement between the two solutions. (Author)
AD-653 873 HC$3.00 MF$0.65

SOME PRELIMINARY EXPERIMENTS ON PROBE INTERFERENCE IN HYPERSONIC NEAR WAKES,
Polytechnic Inst of Brooklyn N Y Dept of Aerospace Engineering and Applied Mechanics
Pasquale M. Sforza. Apr 67, 24p
PIBAL-1011
Contract Nonr-839 (38), ARPA Order-529

Descriptors: (*Hypersonic flow, Probes), (*Probes, Interference), (*Wake, Hypersonic characteristics), Slender bodies, Conical bodies, Reynolds number, Base pressure, Supersonic characteristics, Stagnation point.
Identifiers: Defender project.

Preliminary results concerning the effects of probing the recirculation region of a slender cone in hypersonic flow with conventional diagnostic techniques are presented. Experiments were performed at a free stream Mach number of 11.8 and unit Reynolds number of 600,000 per foot on a 5 degree half-angle cone with a base diameter of 10 in. The centerline axis of the recirculation region was investigated with various probes extended from the base (probe diameters were roughly one-hundredth of the base diameter) while base pressure at the base centerline and centerline pitot pressure at a station in the supersonic near wake were monitored. Similar studies were made while monitoring only the stagnation temperature profile in the supersonic near wake. It was found, for the above experimental conditions at least, that probes placed along the axis distorted downstream pitot pressures while off-axis curved probes did not appreciably alter either base pressure or downstream pitot pressure. In addition, it was found that extending even the off-axis probe too far from the base into the recirculation region (into the vicinity of the rear stagnation point) greatly disturbs the stagnation temperature profile at a station in the supersonic near wake. (Author)
AD-653 875 HC$3.00 MF$0.65

CONVECTION IN A BOX: LINEAR THEORY,
Rand Corp Santa Monica Calif
Stephen H. Davis. Jun 67, 45p Rept no. RM-5251-PR
Contract F44620-67-C-0045

Descriptors: (*Fluid mechanics, *Convection (Heat transfer)), Models (Simulations), Mathematical analysis, Numerical analysis, Fluid dynamic properties, Convection (Atmospheric).

The linear stability of a quiescent, three-dimensional rectangular box of fluid heated from below is considered. It is found that finite rolls (cells with two nonzero velocity components dependent on all three spatial variables) with axes parallel to the shorter side are predicted. When the depth is the shortest dimension, the cross-sections of these finite rolls are near-square, but otherwise (in wafer-shaped boxes) narrower cells appear. The value of the critical Rayleigh number and preferred wave number (number of finite rolls) for a given size box is determined for boxes with horizontal dimensions h, $1/4 = or < h/d = or < 6$, where d is the depth. (Author)
AD-653 924 HC$3.00 MF$0.65

THE EFFECT OF FROUDE NUMBER ON THE TWO-DIMENSIONAL FLOW OF AN INVISCID DENSITY-STRATIFIED LIQUID PAST A SLENDER BODY,
Boeing Scientific Research Labs Seattle Wash Flight Sciences Lab
E. W. Graham, and B. B. Graham. Apr 67, 27p
Rept no. D1-82-0614, 114

Descriptors: (*Slender bodies, Fluid flow), (*Liquids, Two-dimensional flow), Density, Acceleration, Gravity, Force (Mechanics), Lift, Vortices, Drag, Differential equations.
Identifiers: Stratified media, Froude number.

The linearized equation governing the flow of a density-stratified liquid is used, small velocity perturbations and an exponential variation of density with height having been assumed. The effect of accelerative forces is included in addition to gravity forces; thus, there is no restriction to small Froude numbers. A simple transformation of the partial differential equation puts it in a form analogous to the small Froude number equation studied in earlier reports. Solutions are then obtained by analogy to small Froude number solutions. Two types of singularities are considered, the vortex (lift producing) and the 'pseudo-dipole' (thickness and lift producing). The latter is used in place of a simple dipole (producing thickness only) because pseudo-dipoles on a horizontal plane located in a closed channel (symmetrically) or in an infinite fluid produce a body which is symmetrical top to bottom. The lift force is required to maintain this body symmetry at non-zero Froude numbers, but disappears as the Froude number approaches zero. The effect of Froude number on upstream disturbances, lee waves and wave drag is indicated. (Author)
AD-653 946 HC$3.00 MF$0.65

EXPERIMENTAL DETERMINATION OF THE LAW OF HEAT EXCHANGE FOR THE TURBULENT BOUNDARY LAYER IN A SUPERSONIC FLOW,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20M.
AD-653 956 HC$3.00 MF$0.65

A PROGRAM FOR CALCULATING RADIATION FLOW AND HYDRODYNAMIC MOTION,
Rand Corp Santa Monica Calif
H. L. Brode, W. Asano, M. Plemmons, L. Scantlin, and A. Stevenson. Apr 67, 411p Rept no. RM-5187-PR
Contract F44620-67-C-0045

Descriptors: (*Hydrodynamics, Computer programs), (*Heat transfer, Computer programs), Thermal radiation, Diffusion, Numerical analysis, Subroutines, Explosions, Shock waves, Gas flow, Difference equations, Integration, Flow charting.

The report contains a numerical program for solving hydrodynamic flow and radiation transport problems in the diffusion and grey-body approximations. The program is appropriate to the solution of explosion and shock wave problems, and to the study of high explosive or nuclear fireballs, hot gas dynamics, deflagrations and detonations, bubble phenomena, shock tube flows, and can be adapted to a host of other dynamics problems. It is restricted to plane, cylindrical, or spherical symmetry. The report offers (1) a description of the assumed physical model, (2) a rationale for the difference equations and integration techniques used in the mathematical formulation, (3) a complete set of flow diagrams for the program and its subroutines, (4) a listing of the code, (5) two illustrative example calculations for hydrodynamics and for radiation flow, and (6) helpful hints for checking and running versions of the program. (Author)
AD-653 965 HC$3.00 MF$0.65

INVESTIGATION OF HEAT TRANSFER AND SUCTION AS A MEANS FOR TRIPPING THE BOUNDARY LAYER.
Final rept., 21 Apr-21 Oct 66
Douglas Aircraft Co Inc Long Beach Calif Aircraft Div
T. Cebeci, and A. M. O. Smith. Oct 66, 29p Rept no. DAC-33394
Contract NOw-66-0396

Descriptors: (*Boundary layer, *Heat transfer), (*Airfoils, Boundary layer), Surface temperatures, Pressure, Suction slots, Transition temperature, Stability, Reynolds number, Viscosity, Laminar flow, Tests.

An experimental investigation was made to determine the feasibility of tripping the laminar boundary layer on an airfoil by means of heat transfer or suction through an isolated hole. The effect of heat transfer on both favorable and adverse pressure gradients was studied. It was found that neither heat transfer nor suction was adequate to precipitate transition within the limits of these experiments for chord Reynolds numbers between 1.6 x 1,000,000 and 2.46 x 1,000,000. The experimental findings were checked by the boundary-layer-stability analysis, and excellent agreement was obtained with experiment. (Author)
AD-653 980 HC$3.00 MF$0.65

THEORETICAL AND EXPERIMENTAL STUDIES OF LAMINAR FLOW SEPARATION ON FLAT PLATE-WEDGE COMPRESSION SURFACES IN THE HYPERSONIC STRONG INTERACTION REGIME.
Final rept.,
Cornell Aeronautical Lab Inc Buffalo N Y
M. S. Holden. May 67, 88p Rept no. CAL-AF-1894-A-2
ARL-67-0112
Contract AF 33 (615)-1205

Descriptors: (*Laminar flow, *Flow separation), (*Wedges, Flow separation), (*Flat plate models, Flow separation), (*Hypersonic flow, Flow separation), Flow fields, Viscosity, Boundary layer, Shock waves, Interactions.

The report describes a theoretical and experimental investigation of the properties of attached and separated regions of shock wave-laminar boundary layer interactions in the strong interaction regime. A study was made of the flow over a flat plate-wedge compression surface in the high Mach number, low Reynolds number regime where the interaction between the viscous and inviscid regions over the basic flat plate is 'strong' and of fundamental importance to the problem. The theoretical analysis described in the first part of the paper treats the development of the viscous layer and its interaction with the external inviscid stream, using an integral representation for the boundary layer equations. The analysis describes the strong interaction over the flat plate, the transition from a supercritical to a subcritical boundary layer upstream of the separation point, and the subsequent development of the viscous layer through to the end of the interaction. The theory was compared with experimental measurements in both strong and weak interaction regions of separated flow. The complementary experimental study described in the second part of the paper was designed to in-

vestigate the shock wave-boundary layer interaction on flat plate-wedge compression surfaces in the strong interaction regime. (Author)
AD-653 985 HC$3.00 MF$0.65

ON THE SOLAR DIFFERENTIAL ROTATION AND MERIDIONAL CURRENTS,
Aerospace Corp El Segundo Calif Labs Div
For primary bibliographic entry see Field 3B.
AD-653 987 HC$3.00 MF$0.65

RESEARCH ON MIXING OF COAXIAL STREAMS.
Final technical rept., Nov 63-Nov 66,
Illinois Inst of Tech Chicago Dept of Mechanical and Aerospace Engineering
A. A. Fejer, T. P. Torda, L. I. Boehman, K. N. Ghia, and W. G. Hermann. Mar 67, 192p
ARL-67-0058, ARL-FM-3
Contract AF 33 (615)-1024

Descriptors: (*Jets, Diffusion), Mass transfer, Momentum, Turbulence, Orifices, Mixtures, Viscosity, Vortices.

The report presents the results of experimental and analytical investigations of the confined coaxial mixing of isoenergetic air streams. Both uniflowing and counterflowing secondary air streams are considered. Laminar and turbulent uniflow m xing are treated analytically. The results of experimental investigations of turbulent mixing are used to calculate the radial as well as the axial variations of eddy viscosity and the turbulent diffusion coefficient up to 25 jet diameters downstream of jet orifice. New expressions are developed to yield reliable values in regions of mixing where existing expressions become indeterminate. Special consideration is given to the case where the two streams have equal velocity. The experimental investigation of turbulent counterflow mixing shows that a toroidal shaped vortex is set up at the jet interface which gives rise to depressed static pressures. Over the range of parameters investigated, entrainment of fluid from the inner jet into the external stream takes place downstream of the vortex. (Author)
AD-654 014 HC$3.00 MF$0.65

A REVIEW OF SOME RECENT PROGRESS IN UNDERSTANDING CATASTROPHIC YAW,
Notre Dame Univ Ind Dept of Aero-Space Engineering
John D. Nicolaides. 1966, 24p
AGARD-551
Contract AF 08 (635)-5275
NATO Furnished.

Descriptors: (*Yaw, Reviews), (*Roll, Theory), (*Supersonic characteristics, Yaw), (*Subsonic characteristics, Yaw), Fins, Leading edge, Vortices, Conical bodies, Wind tunnels.
Identifiers: Roll lock-in.

Catastrophic yaw and roll lock-in are studied at supersonic and subsonic speeds. Roll lock-in is found to occur on isolated fins and is traced to a leading edge vortex. Free rolling motions are found to be accurately represented by the roll lock-in theory. Catastrophic yaw is observed in three-degree-of-freedom and six-degree-of-freedom wind tunnel tests. Mass asymmetry in a 10 degree cone is found to cause rolling velocity, roll lock-in, and catastrophic yaw. (Author)
AD-654 035 HC$3.00 MF$0.65

EQUILIBRATION OF A SINGLE-SPECIES TWO-TEMPERATURE GAS MIXTURE,
Northwestern Univ Evanston Ill Technological Inst
David Mintzer, and Charles A. Ward. 1967, 15p
Research sponsored in part by ARPA and ONR.
Availability: Published in Rarefied Gas Dynamics, Symposium (5th) v1 p661-74 1967.

Descriptors: (*Superaerodynamics, Thermodynamics), Distribution functions, Moments, Mixtures, Gases, Diffusion.

Consideration is given to the problem of a monatomic gas, half of whose particles are at one temperature and the other half at another temperature, both being uniformly distributed in space. The generalized orthogonal polynomial method of solution is used to determine the distribution function, first in terms of the final equilibrium distribution, and then in terms of the initial distribution. The coefficients of each series representation are determined for the case of an arbitrary central field interparticle force law, necessitating truncation of the transport equations for the coefficients. The effect of truncation is illustrated by the time evolution of the fourth-order moment. (Author)
AD-654 096 Not available from CFSTI.

TWO-DIMENSIONAL GRAVITY WAVES IN A STRATIFIED OCEAN,
California Inst of Tech Pasadena Div of Engineering and Applied Science
T. Yao-tsu Wu, and C. C. Mei. 19 Sep 66, 6p
Rept no. Pub-97-14
Contract Nonr-220 (35)
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge.
Availability: Published in The Physics of Fluids v10 n3 p482-6 Mar 1967.

Descriptors: (*Ocean waves, Gravity), Initial value problems, Fluid mechanics, Two-dimensional flow.

The solution of the two-dimensional gravity waves in a plane stratified ocean previously calculated by the authors is rectified. By formulating a corresponding initial value problem, the steady-state solution becomes completely determinate without using the radiation condition. (Author)
AD-654 122 Not available from CFSTI.

HEAT TRANSFER AND BINARY DIFFUSION WITH THERMODYNAMIC COUPLING IN VARIABLE-PROPERTY FORCED CONVECTION ON A FLAT PLATE.
Clarkson Coll of Technology Potsdam N Y
For primary bibliographic entry see Field 20M.
AD-654 141 Not available from CFSTI.

DRAG REDUCTION BY DILUTE POLYMER SOLUTIONS IN TURBULENT FLOW.
Interim rept.,
Naval Research Lab Washington D C
Ralph C. Little. 31 May 67, 25p Rept no. NRL-6542

Descriptors: (*Polymers, *Lubricants), (*Drag. Reduction), (*Turbulence, Drag), Pipes, Solutions, Flow fields, Heat-resistant glass, Viscosity, Birefringence.
Identifiers: Drag-reducing fluids.

The mechanism by which water-soluble polymers reduce hydrodynamic drag on solid surfaces was investigated by measurements of flow birefringence and of turbulent flow in pipes. Flow birefringence and flow field orientation of Polyox polymers in the molecular weight range from 200,000 to 6,000,000 showed that Polyox macromolecules continue to deform with increasing velocity gradient even after alignment with the flow field (at gradients in excess of 2000/sec). All solutions used were found to be Newtonian, with the exception of the AcrysolA-5 solutions. The flow data for Polyox solutions in a Pyrex pipe were examined in terms of Meyer's fluid property parameter and Elata's relaxation time hypothesis for the initiation of drag reduction. It was found that drag reduction in the Pyrex pipe was initiated at a value of the order of one-fifth that predicted by Elata's theory. Moreover, added salt (the solution being 0.3 molar in K2SO4) had no effect on the flow of Polyox Coagulant solutions even though the intrinsic viscosity (upon which Rouse relaxation times depend) was cut to slightly more than one-third of its value in the pure solvent. The unusually high values of Meyer's fluid property parameter observed at low concentrations suggests that adsorption on the Pyrex pipe walls may be playing a role in drag reduction. (Author)
AD-654 160 HC$3.00 MF$0.65

REPORT ON THE WORK COMMON TO DORNIER SYSTEM AND THE R. A. E. CARRIED OUT AT THE ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH AND AT THE PROOF AND EXPERIMENTAL ESTABLISHMENT AT PENDINE.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 15.
N67-27789 HC$3.00 MF$0.65

TURBULENT DIFFUSION DUE TO DRIFT INSTABILITY DRIVEN BY A TEMPERATURE GRADIENT.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Laboratorio Gas Ionizzati.
A. Cavaliere, B. Coppi, and F. Engelmann. Nov 66, 28p LGI-66-12
Presented At Euratom Symp. on Theoret. Plasma Phys., Varenna, Italy, 1966 Sponsored in Part By Euratom

Descriptors: *Drift, *Instability, *Temperature gradient, *Turbulent diffusion, Coefficient, Diffusion, Electron, Electrostatic, Energy, Gradient, Ion, Mode, Physics, Plasma, Propagation, Space, Spectrum, Temperature, Turbulent, Velocity.

For abstract, see STAR 05 15.
N67-27802 HC$3.00 MF$0.65

CONTRIBUTION TO THE STUDY OF "PANEL FLUTTER".
Contributo Allo Studio Del "panel Flutter"
Rome Univ. (Italy). Aerospace Research Center.
R. Barboni, and P. Santini. Nov 66, 30p
in Italian, English Summary Sponsored in Part By C.N.R. Its Atti No. 14

Descriptors: *Boundary layer stability, *Critical frequency, *Panel flutter, Aerodynamic, Aircraft, Boundary, Condition, Damping, Flutter, Layer, Panel, Plate, Stability, Stiffness, Structure, Supersonic.

For abstract, see STAR 05 15.
N67-27803 HC$3.00 MF$0.65

APPROXIMATE CALCULATIONS OF THE IMCOMPRESSIBLE LAMINAR BOUNDARY LAYER.
Aeronautical Research Council (Gt. Brit.)
N. Hayasi, and M. R. Head. 15 Nov 66, 24p
ARC-28507

Descriptors: *Approximation method, *Incompressible flow, *Laminar boundary layer, Approximation, Boundary, Difference, Finite, Flow, Fluid, Incompressible, Laminar, Layer, Mechanics, Method, Problem, Profile, Solution, Velocity.

For abstract, see STAR 05 15.
N67-27872 HC$3.00 MF$0.65

SOME SPACER EFFECTS IN ANNULAR AND CLUSTER GEOMETRIES IN TWO PHASE ANNULAR DISPERSED FLOW.
Centro Informazioni Studi Esperienze, Milan (Italy).
P. Alia, L. Cravarolo, A. Hassid, and E. Pedrocchi. Nov 66, 58p EURAEC-1092, CISE-R-110

Contract EURATOM-060-61-7-RDI
Its Topical Rept.-17

Descriptors: *Annular flow, *Cluster, *Flow geometry, *Two-phase flow, Adiabat, Annulus, Bundle, Film, Flow, Gas, Geometry, Liquid, Loss, Phase, Pressure, Rod, Spacer, Thickness, Two, Upward, Variation, Vertical.

For abstract, see STAR 05 15.
N67-28213 HC$3.00 MF$0.65

EXPERIMENTAL STUDY OF SUPERLAMINAR FLOW BETWEEN NONCONCENTRIC ROTATING CYLINDERS.
Mechanical Technology, Inc., Latham, N. Y.
J. Vohr. Jun 67, 74p NASA-CR-749
Contract NASW-1021

Descriptors *Laminar flow, *Rotating cylinder, Bearing, Cylinder, Eccentricity, Flow, Fluid, Friction, Laminar, Pressure, Profile, Rotation, Speed, Torque, Transition, Turbulence, Visualization, Vortex.

For abstract, see STAR 05 15.
N67-28372 HC$3.00 MF$0.65

PRELIMINARY EXPERIMENTS ON THE INFLUENCE OF FLEXIBLE WALLS ON BOUNDARY LAYER TURBULENCE.
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Oberpfaffenhofen (West Germany). Institut Fuer Steuer- Und Regeltechnik.
A. Dinkelacker. Dec 66, 81p DLR-FB-66-78, DVL-570
Sponsored By the Min. of Aviation, London

Descriptors: *Boundary layer, *Turbulence, *Wall flow, Boundary, Drag, Flexibility, Flow, Friction, Layer, Noise, Pressure, Reduction, Skin, Stabilization, Transition, Tube, Wall.

For abstract, see STAR 05 15.
N67-28667 HC$3.00 MF$0.65

SLIP RATIOS AND FRICTION FACTORS IN THE BUBBLE FLOW REGIME IN VERTICAL TUBES.
Institutt for Atomenergi, Kjeller (Norway).
D. Malnes. May 66, 93p KR-110

Descriptors: *Bubble, *Friction, *Slip, *Water flow, Adiabat, Distribution, Flow, Gas, Liquid, Measurement, Phase, Ratio, Steam, Tube, Two, Velocity, Vertical, Void, Water.

For abstract, see STAR 05 15.
N67-28865 HC$3.00 MF$0.65

THE PRODUCTION OF INTENSE SHEAR LAYERS BY VORTEX STRETCHING AND CONVECTION.
Advisory Group for Aerospace Research and Development, Paris (France).
J. T. Stuart. May 65, 37p AGARD-514
Presented At the Agard Specialist Meeting, Naples, 10-14 May 1965

Descriptors: *Laminar boundary layer, *Mathematical model, *Shear layer, *Vorticity equation, Bibliography, Boundary, Component, Convection, Equation, Field, Flow, Laminar, Layer, Mathematics, Model, Shear, Stretching, Theory, Transition, Vortex, Vorticity.

For abstract, see STAR 05 15.
N67-28880 HC$3.00 MF$0.65

20E. MASERS AND LASERS

PRESSURE SHIFT OF THE Cr LEVELS IN Al2O3,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20L.
AD-653 658 Not available from CFSTI.

RESEARCH STUDY OF A CO2 LASER RADAR TRANSMITTER.
Raytheon Co Waltham Mass Research Div
For primary bibliographic entry see Field 18H.
AD-653 725 HC$3.00 MF$0.65

RAY PENETRATING INTO THE FUTURE ULTRADISTANT COSMIC COMMUNICATION LIGHT PULSES OF SATELLITES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 17B.
AD-653 962 HC$3.00 MF$0.65

ADJUSTABLE MIRROR MOUNT DESIGN USING KINEMATIC PRINCIPLES.
Royal Aircraft Establishment, Farnborough (England).
D. A. Bateman. Nov 66, 29p RAE-TR-66349

Descriptors: *Laser, *Mirror, Design, Gas, Head, Hinge, Hole, Kinematics, Micrometer, Mount, Precision, Slot, Solid, State.

For abstract, see STAR 05 15.
N67-28362 HC$3.00 MF$0.65

20F. OPTICS

ZUR ANWENDUNG DES SEQUENTIELLEN LICHTVERSTAERKERS IN DER ASTRONOMIE (The Use of Sequential Light Amplifiers in Astronomy),
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 400 Not available from CFSTI.

AN INTRODUCTION TO THE PROBLEM OF PHOTOGRAPHING ARTIFICIAL SATELLITES,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 405 Not available from CFSTI.

SOME EARLY TRIALS OF ASTRONOMICAL PHOTOGRAPHY BY TELEVISION METHODS,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 406 Not available from CFSTI.

ASTRONOMICAL OBSERVATIONS BY MEANS OF HIGHLY SENSITIVE ELECTRONIC LIGHT AMPLIFICATION,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 407 Not available from CFSTI.

MEASUREMENT OF ABSORPTION-LINE PROFILES WITH A FABRY-PEROT INTERFEROMETER,
Massachusetts Inst of Tech Lexington Lincoln Lab
Lee C. Bradley, III, and Robert J. Hull. 2 Jun 66, 9p Rept no. JA-2848
ESD-TR-67-253
Contract AF 19(628)-5167, ARPA Order-512
Prepared in cooperation with California Univ., Berkeley.
Availability: Published in Journal of the Optical Society of America v57 n1 p11-8 Jan 1967.

Descriptors: (*Line spectrum, Measurement), (*Interferometers, Spectroscopy), Absorption spectrum, Errors, Instrumentation, Distortion, Integrals, Fourier analysis, Series.

Calculation was made of the line profiles to be expected when a Fabry-Perot interferometer is used to measure absorption lines. It is shown that large errors may be introduced in the measurement of the integrated absorption, even when an interferometer of high finesse is used. Curves and tables are given for finding the true absorption width and the true peak absorption from the apparent values observed under different operating conditions of the emission light source and the interferometer. It is shown qualitatively that the distortions are partially due to the presence of nonzero wings in the instrument-bandpass function. Finally, a Fourier series expansion of the integral is shown which gives the transmittance of the Fabry-Perot interferometer when absorbing atoms are in the light path. (Author)
AD-653 410 Not available from CFSTI.

ELECTROOPTIC EFFECT IN TRIGONAL SELENIUM AT 10.6 UM,
Massachusetts Inst of Tech Lexington Lincoln Lab
Malvin C. Teich, and Thomas A. Kaplan. 9 Aug 66, 3p Rept no. JA-2879
ESD-TR-67-200
Contract AF 19(628)-5167
Availability: Published in IEEE Journal of Quantum Electronics vQE-2 n10 p702-3 Oct 1966.

Descriptors: (*Electrooptics, *Selenium), Optical properties, Infrared radiation, Lasers, Semiconductors, Refractive index, Crystal structure, Gallium arsenides.

The electrooptic effect in crystalline selenium (32 point-group symmetry) for 10.6 microns radiation was observed and its value measured to be r11 is approximately equal to 2.5 X 10 to the -10th power cm/V, which is in qualitative agreement with Miller's phenomenological theory of second harmonic generation and electrooptic effect. (Author)
AD-653 412 Not available from CFSTI.

THE LIMITATIONS FOR NIGHT-TIME DETECTION OF CELESTIAL BODIES EMPLOYING THE INTENSIFIER-STORAGE-IMAGE ORTHICON,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 416 Not available from CFSTI.

HEAVILY DOPED SILICON AS A LOW TEMPERATURE TRANSMISSION FILTER FOR THE FAR INFRARED,
Massachusetts Inst of Tech Cambridge National Magnet Lab
L. J. Neuringer, and R. C. Milward. 1 Feb 67, 2p
AFOSR-67-1343
Contract F44620-67-C-0047
Availability: Published in Applied Optics v6 n5 p978 May 1967.

Descriptors: (*Silicon, *Infrared optical materials), Cryogenics, Infrared transmitters, Refractive index, Absorption spectrum, Optical properties.

Heavily doped, uncompensated n-or p-type silicon (10 to the 18th power impurity atoms per cc) is suitable for use, at liquid helium temperatures, as a cut off filter for radiation in the range 10-100 per cm. (Author)
AD-653 497 Not available from CFSTI.

APPLICATION OF NANOSECOND LIGHT PULSES TO BALLASTIC RANGE MEASUREMENTS,

Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 19D.
AD-653 498 Not available from CFSTI.

APPLICATION OF SPECTROSCOPIC METHODS FOR DIAGNOSTICS OF LOW TEMPERATURE PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-653 557 HC$3.00 MF$0.65

ANGULAR EFFECTS IN A MILLIMETER WAVE SEMICONDUCTOR INTERFEROMETER.
Technical rept.,
Army Electronics Command Fort Monmouth N. J.
Harold Jacobs, Edward Horn, Ronald Hofar, and George Morris. Mar 67, 62p Rept no. ECOM-2816

Descriptors: (*Millimeter waves, *Interferometers), (*Semiconductors, Millimeter waves), Images, Reflection, Multiple operation, Optics, Mathematical analysis, Electromagnetic waves, Conductivity, Optical properties, Thickness, Air, Dielectric properties, Metals, Tables.

In a recent investigation, it was shown that electromagnetic radiation incident upon a layered system could give interferometric effects which result in zero reflection. It was shown that for millimeter waves falling upon a system composed of air as the transmitting medium, semiconductor, air, and metal reflector, critical parameters of conductivity, thickness and dielectric constant will give the desired results. Furthermore, by modulating the conductivity of the semiconductor, the reflection coefficient of the system could be varied. In this report, we consider the effects of angular incidence upon the interferometric system. It is concluded that the reflection coefficient is relatively insensitive to angle, and that in the application to the millimeter wave imaging system previously proposed, the optimum condition will be for planar construction of the multilayered device. (Author)
AD-653 646 HC$3.00 MF$0.65

INTERBAND MAGNETOOPTICAL STUDIES OF SEMICONDUCTORS AND SEMIMETALS,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20J.
AD-653 672 Not available from CFSTI.

LOW TEMPERATURE ABSOLUTE REFLECTION MEASUREMENTS OF SMALL SAMPLES,
Massachusetts Inst of Tech Lexington Lincoln Lab
Julius Feinleib, and Bernard Feldman. 8 Sep 66, 3p Rept no. JA-2878
ESD-TR-67-199
Contract AF 19 (628)-5167
Availability: Published in The Review of Scientific Instruments v38 n1 p32-3 Jan 1967.

Descriptors: (*Reflectivity, Measurement), (*Optical instruments, Reflectivity), Cryogenics, Crystals, Standards, Optical properties, Light.

The design of an optical system for making absolute reflectance measurements on small crystals at liquid helium and room temperature is described. The system permits accurate masking of the samples and, with only one moving component, measures reflectivity without the use of a comparison standard. (Author)
AD-653 673 Not available from CFSTI.

ADJUSTABLE MIRROR MOUNT DESIGN USING KINEMATIC PRINCIPLES.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
D. A. Bateman. Nov 66, 29p Rept no. RAE-TR-66349

Descriptors: (*Mirrors, *Design), Kinematics, Optics, Lasers, Optical equipment, Tables, Sensitivity, Tests.

Various designs of mirror mounts are discussed in relation to their performance, construction, choice of materials, etc., together with the principles of kinematic design. Examples are given of systems incorporating many of the optimum design features described which have a precision of several seconds of arc and which are suitable for general optical and laser work. (Author)
AD-653 695 HC$3.00 MF$0.65

MEASUREMENT OF DIFFUSION LENGTHS IN DIRECT-GAP SEMICONDUCTORS BY ELECTRON-BEAM EXCITATION.
University of Southern California Los Angeles
For primary bibliographic entry see Field 20L.
AD-653 822 Not available from CFSTI.

EXCITONS AND OPTICAL PROPERTIES OF THE ALKALI HALIDES,
Rochester Univ N Y Inst of Optics
Kenneth J. Teegarden. Jun 67, 3p
AFOSR-67-1386
Grant AF-AFOSR-236-65
Availability: Published in Proceedings of the American Physical Society, Nashville, Tenn., Spring meeting, abstract.

Descriptors: (*Alkali metal compounds, Halides), (*Halides, Optical properties), Absorption spectrum, Cryogenics, Band theory of solids, Excitons, Solid state physics.

Evidence for the existance of Wannier exciton states in alkali halide crystals is reviewed. New data on the absorption spectra of these materials at 10 degrees K is presented and related to calculated band structures. It is shown that certain exciton lines, not previously understood, are probably related to a 2 d-like conduction band which lies above, but close to, the lowest s-like band. (Author)
AD-653 830 Not available from CFSTI.

INFRARED COATING STUDIES.
Quarterly rept. no. 4, 16 Mar-15 Jun 67.
Bausch and Lomb Inc Rochester N Y Research and Development Div
15 Jun 67, 17p
Contract DA-44-009-AMC-1707 (E)
See also AD-650 222.

Descriptors: (*Infrared filters, *Optical coatings), (*Infrared optical materials, Optical coatings), Films, Vapor plating, Thallium compounds, Bromides, Fluorides, Substrates, Germanium, Silicon, Reflectivity, Light transmission, Band-pass filters, Dielectrics.
Identifiers: Thallium bromides, Thallium fluorides.

Research was carried out on coating materials for the far infrared. Films of TlBr and TlF were prepared and evaluated. Silicon and germanium were evaluated as substrate materials for the infrared to 40 microns. Measured curves of reflectance and transmittance are presented. The results of single layer anti-reflection coatings for these substrates are also given. Low frequency pass filters constructed and measured transmittance curves are presented. Two bandpass filter designs of the twin cavity all-dielectric type are also described. Maximum transmittance near 32 microns was obtained.
AD-653 850 HC$3.00 MF$0.65

NEW METHOD FOR OBTAINING EMISSION COEFFICIENTS FROM EMITTED SPECTRAL INTENSITIES. PART I. CIRCULARY SYMMETRIC LIGHT SOURCES,
Northrop Aircraft Inc Hawthorne Calif
C. D. Maldonado, A. P. Caron, and H. N. Olsen. 5 Apr 65, 12p
ARL-67-0038
Contract AF 33 (615)-1105
Availability: Published in Journal of the Optical Society of America v55 n10 p1247-54 Oct 1965.

Descriptors: (*Optics, *Mathematical analysis), Optical analysis, Differential equations, Light, Intensity, Functions, Integrals, Fourier analysis, Tables, Polynomials.

A new method is presented for obtaining the spatial distribution of the emission coefficient from the spectral intensity emitted by a circularly symmetric light source. In this method the emission coefficient is expanded in terms of a complete set of functions which are, 'invariant in form' to a rotation of axes and the integral equation relating the emission coefficient to the emitted spectral intensity is used to determine the unknown expansion coefficients. The resultant series representations for the emitted spectral intensity and emission coefficient are shown to give results consistent with those of the integral equation by means of a hypothetical example. Four examples, one analytical and three experimental, are treated numerically to test the practical value of this method. The numerical results for the corresponding emitted spectral intensity and emission coefficient are in excellent agreement with the theoretical and experimental values as well as with the values calculated by the Nestor-Olsen method. (Author)
AD-653 896 Not available from CFSTI.

THE INVARIANT IMBEDDING EQUATIONS FOR THE DISSIPATION FUNCTIONS OF AN INHOMOGENEOUS FINITE SLAB WITH ANISOTROPIC SCATTERING,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 20M.
AD-653 923 HC$3.00 MF$0.65

THE ATOMIC ABSORPTION CROSS SECTIONS OF LITHIUM AND SODIUM BETWEEN 600 AND 1000 A,
Aerospace Corp El Segundo Calif Labs Div
For primary bibliographic entry see Field 7D.
AD-653 991 HC$3.00 MF$0.65

AIRBORNE ELECTRONIC ULTRA-FAST SCANNING SPECTROMETER,
Utah State Univ Logan Electro-Dynamics Labs
For primary bibliographic entry see Field 17E.
AD-653 997 HC$3.00 MF$0.65

INTERPRETATION OF THE OPTICAL SPECTRUM OF Yb3+ IN CdF2.
Doctoral thesis,
Polytechnic Inst of Brooklyn N Y
Victor J. Abbruscato. Jun 67, 81p Rept no. TR-2
AROD-3948:2-C
Contract DA-31-124-ARO (D)-71

Descriptors: (*Optical analysis, *Ytterbium), (*Cadmium compounds, Optical analysis), Fluorides, Electron spin resonance, Ions, Distortion, Rare earths, Crystals, Absorption, Physical properties, Absorption spectrum, Tables, Crystal growth, Doping, Symmetry (Crystallography), Paramagnetic resonance, Excitation, Spectrometers.

The optical absorption spectra of Yb (3+) in CdF2 and of Yb (3+) in CdF2 in the presence of various co-dopants such as Na (+), Y (3+), and Eu (3+) were recorded and the oscillator strengths of the main absorptions of the Yb (3+) in the 10,000/cm

region were calculated. Also, the Electron Spin Resonance (ESR) spectra of Yb (3+) in CdF2 and Yb (3+) in CdF2 in the presence of Na (+), 2% Y (3+) and 10% Y (3+) were recorded. Non-cubic spectra were observed only in the case of the Yb (3+) -Na (+) -CdF2 and Yb (3+) -10% Y (3+) -CdF2 samples. The former non-cubic spectrum was interpreted assuming a rhombic distortion with the major distortion axis along the 110 direction, while the latter could not be interpreted due to the broadness of the absorptions. From the results of these measurements and the comparison to the optical spectra of Yb (3+) in other systems, it has been concluded that the previous interpretation of the optical spectrum of Yb (3+) in CdF2 is incorrect. It is the contention of this thesis that the main absorption line at 10,250/cm is not due to an internal f-f transition but is due to some other mechanism. Possible mechanisms are proposed based on some of the unusual physical properties of trivalent rare earth ions in CdF2. (Author)
AD-654 047 HC$3.00 MF$0.65

OPTICAL PHENOMENA ASSOCIATED WITH THE SHOCK COMPRESSION OF SODIUM CHLORIDE AND POTASSIUM BROMIDE,
Stanford Research Inst Menlo Park Calif Poulter Labs
For primary bibliographic entry see Field 20K.
AD-654 113 Not available from CFSTI.

TWO POSSIBLE USES OF AN ELECTRON-OPTICAL STRUCTURE FOR PROCESSING OPTICAL SIGNALS MODULATED AT FREQUENCIES UP TO 1012 CYCLES/SEC.
United Kingdom Atomic Energy Authority, Harwell (England). Electronics and Applied Physics Div.
P. Iredale. Jan 67, 9p AERE-M-1813

Descriptors: *Optical signal, *Signal mixing, Beam, Converter, Electron, Frequency, Image, Mixing, Modulation, Optical, Photomultiplier, Processing, Signal.

For abstract, see STAR 05 15.
N67-27783 HC$3.00 MF$0.65

EDGE DIFFRACTION FROM TRUNCATED PARABOLOIDS AND HYPERBOLOIDS.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
W. V. Rusch. 1 Jun 67, 18p NASA-CR-84787, JPL-TR-32-1113
Contract NAS7-100

Descriptors: *Diffraction, *Optics, *Parabolic reflector, Edge, Geometry, Hyperbola, Light, Paraboloid, Scattering, Shadow, Truncation, Vector.

For abstract, see STAR 05 15.
N67-28375 HC$3.00 MF$0.65

ACCURATE GUIDANCE WITH LARGE OPTICAL EQUIPMENT.
California Inst. of Tech., Pasadena.
For primary bibliographic entry see Field 17G.
For abstract, see STAR 05 15.
N67-28839 HC$3.00 MF$0.65

20G. PARTICLE ACCELERATORS

SCATTERING OF THERMAL ENERGY GAS BEAMS BY METALLIC SURFACES II,
United Aircraft Corp East Hartford Conn Research Labs
For primary bibliographic entry see Field 7D.
AD-653 720 HC$3.00 MF$0.65

THE UCLA 45-MeV POLARIZED PROTON BEAM,
California Univ Los Angeles
T. A. Cahill, and J. Reginald Richardson. 1965, 3p
Contract Nonr-233 (44)
Availability: Published in Proceedings of the International Symposium on Polarization Phenomena of Nucleons (2nd), Karlsruhe (West Germany), Sep 6-10 1965, Suppl 12, Basel/Stuttgart 1966 p143-5.

Descriptors: (*Proton beams, Polarization), (*Cyclotrons, Instrumentation), Proton accelerators, Operation, Particle accelerator targets, Carbon, Scattering, Calibration.

The use of an internal scatterer was found to be an effective method of generating a polarized proton beam in the medium energy region. This method can be immediately applied to cyclotrons possessing circulating proton beams in the energy range from 20 to 50 MeV, and probably higher energies, although data on carbon is sparse in the energy region between 50 and 100 MeV. (Author)
AD-653 762 Not available from CFSTI.

SIMPLE METHOD FOR MAKING SULFUR TARGETS.
Revised ed.,
Aerospace Research Labs Wright-Patterson AFB Ohio
D. D. Watson. 29 Jul 66, 5p Rept no. ARL-67-0024
Revision of manuscript submitted 16 Jun 66.
Availability: Published in The Review of Scientific Instruments v37 n11 p1605-6 Nov 1966.

Descriptors: (*Particle accelerator targets, *Sulfur), Silver, Vapor plating, Films, Proton bombardment.

A new method is described for making thin sulfur targets on solid backings. The targets are intended for use in proton capture studies. The method essentially involves the exposure of a heat silver target backing to sulfur vapors at atmospheric pressure and in air.
AD-653 898 Not available from CFSTI.

PLASMA CYCLOTRON ECHOES.
Technical rept.,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Thomas B. Smith. 1 Jun 67, 35p Rept no. TR-458
Contract DA-28-043-AMC-02536 (E)

Descriptors: (*Cyclotrons, *Plasma physics), Cyclotron resonance phenomena, Electron density, Diffusion, Magnetic fields, Frequency, Velocity, Electrons, Reverberation, Electromagnetic waves, Radiofrequency.

The paper contains a single-particle model that is sufficient to explain observed radiation peaks from weakly ionized laboratory plasma immersed in a magnetic field subsequent to one, two or three short driving RF pulses at the gyro frequency. It is shown that, depending upon the regime of operation, these echoes can result from any combination of arbitrary speed dependences in the gyro frequency, collision frequency, or diffusion of the electrons between and after the pulses. (Author)
AD-654 026 HC$3.00 MF$0.65

PHYSICS DIVISION SUMMARY REPORT. ANNUAL REVIEW, APRIL 1, 1965-MARCH 31, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
ANL-7246 HC$3.00 MF$0.65

ON THE SHIELDING OF THE EXTERNAL PROTON TUNNEL AREA OF ARGONNES ZERO GRADIENT SYNCHROTRON,
Argonne National Lab., Ill.
H. J. Howe, Jr., G. V. Oldfield, and D. J. Sreniawski. Nov 66, 22p
Contract W-31-109-eng-38

Descriptors: (*Synchrotrons, *Reactor shielding materials), (*Reactor shielding calculations, Nuclear radiation), Ionization chambers, Radiological dosage.

For abstract, see NSA 21 13.
ANL-7273 HC$3.00 MF$0.65

TWO-MILE ACCELERATOR PROJECT.
Quarterly status rept., 1 July-30 Sep 66.
Stanford Linear Accelerator Center, Calif.
Mar 67, 99p
Contract AT (04-3)-400

Descriptors: (*Linear accelerators, Construction), (*Nuclear physics laboratories, *Electron accelerators), Control systems, Electronics, Klystrons, Positrons, Particle accelerators.

For abstract, see NSA 21 13.
SLAC-71 HC$3.00 MF$0.65

20H. PARTICLE PHYSICS

SURFACE-ENERGY TENSORS,
Chicago Univ Ill Dept of Physics
Carl E. Rosenkilde. 30 May 66, 5p
Contract Nonr-2121 (24)
See also AD-619 234.
Availability: Published in Journal of Mathematical Physics v8 n1 p84-8 Jan 1967.

Descriptors: (*Drops, Fluid mechanics), (*Fluid flow, *Perturbation theory), Tensor analysis, Stability, Surface tension, Differential geometry, Gravity, Equations of state, Nuclear models, Rotation, Electrostatics, Kinetic energy, Charged particles, Velocity, Density, Theorems, Liquids, Fluids.

The surface-energy tensors are defined and general expressions for their first variations are obtained. These quantities are appropriate for an investigation of the equilibrium and the stability of a charged liquid drop (held together by a constant surface tension) using the method of the tensor virial, which was developed by Chandrasekhar and Lebovitz for the theory of self-gravitating masses. The definitions are shown to be consistent with the conservation laws.
AD-653 440 Not available from CFSTI.

THE TWO USES OF NON-COMPACT GROUPS IN PARTICLE PHYSICS AND THEIR RELATIONS,
Colorado Univ Boulder
A. O. Barut. 1966, 25p
AFOSR-67-1351
Grant AF-AFOSR-30-65
Availability: Published in Non-Compact Groups in Particle Physics p1-22 1966.

Descriptors: (*Elementary particles, *Groups (Mathematics)), (*Nuclear spins, Groups (Mathematics)), Decay schemes, Interactions, Mass spectrum, S-matrix, Transformations (Mathematics), Theory, Invariance.
Identifiers: Symmetry (Quantum mechanics).

A series of hypotheses are formulated in a systematic discussion of the structure and dynamical group of strongly interacting particles. The consequences of these hypothesis, the mass formula, the transformation property of the S matrix and the minimal extensions of the dynamical group are deduced and compared with experiment. (Author)
AD-653 473 Not available from CFSTI.

INCOHERENT SCATTERING OF MICROWAVES FROM ENHANCED DENSITY FLUCTUATIONS IN A DC DISCHARGE,
Illinois Univ Urbana Coordinated Science Lab
For primary bibliographic entry see Field 20I.
AD-653 521 HC$3.00 MF$0.65

AIR PRESSURE DEPENDENCE OF COSMIC RAY INTENSITY. METHODS AND RESULTS OF A STATISTICAL ANALYSIS ON NEUTRON MONITOR DATA,
Uppsala Univ (Sweden) Cosmic Ray Group
For primary bibliographic entry see Field 18D.
AD-653 579 HC$3.00 MF$0.65

A NEW METHOD OF COMPARING THE PERFORMANCE OF NEUTRON MONITORS,
Uppsala Univ (Sweden) Cosmic Ray Group
For primary bibliographic entry see Field 18D.
AD-653 580 HC$3.00 MF$0.65

ON THE EXPONENTIAL MASS SPECTRUM OF ELEMENTARY PARTICLES,
Aerospace Research Labs Wright-Patterson AFB Ohio
Edwin J. Callan. Mar 67, 20p Rept no. ARL-67-0051

Descriptors: (*Elementary particles, Mass spectrum), (*Baryons, Mass spectrum), (*Mesons, Mass spectrum), Excitation, Groups (Mathematics), Leptons, Mathematical models, Quantum statistics.

Elementary particle masses are found to be quantized exponential multiples of the electron mass. Mass relations closely approximating the Gell-Mann-Okubo relations are obtained for baryons, and mass relations accurate to 2.2% are obtained for mesons. These relations also hold for excited mass states. (Author)
AD-653 588 HC$3.00 MF$0.65

APPLICATION OF METHODS COMMON TO ELEMENTARY PARTICLE PHYSICS AND MANY-BODY PROBLEMS.
Final rept.,
Rio Grande Do Sul Univ Porto Alegre (Brazil) Instituto de Fisica
Gerhard Jacob. May 67, 12p Rept no. 2
Grant DA-ARO-49-092-66-G102

Descriptors: (*Elementary particles, Groups (Mathematics)), (*N-body problem, Elementary particles), (*Nuclear reactions, Field theory), Invariance, Nuclear spins, Electrons, Neutrinos, Diagrams, Proton reactions, Nuclear scattering, Quantum statistics, Perturbation theory, Nuclear structure, Brazil.
Identifiers: Goldstone's theorem, Symmetry (Quantum mechanics).

The problem of broken symmetries in Quantum Electrodynamics was investigated. The role played by current non-conservation and the relation of those non-conserved currents to the Goldstone theorem was clarified through a classical example (the Heisenberg Ferromagnet) and in a Quantum Electrodynamical calculation. It was concluded that spontaneously broken symmetries may be generated by currents with non zero divergence. A distinction is made between two ways of spontaneous symmetry breaking: Local breaking and asymptotical breaking. Finally, the problem of electrons as charged neutrinos was studied quantitatively. Four problems in nuclear physics were and are being studied. The first one was solved and is concerned with the exact sum of the four particle correlation diagrams using the Bethe-Faddeev equation. Two problems concerned with (p,2p) reactions (150-45MeV) are under study, and consist of an investigation of quasi-free diffraction scattering in medium weight nuclei and of a consistent calculation of the distorted momentum distribution in light nuclei. Finally, one problem on the statistical perturbations of angular correlations is being worked on. (Author)
AD-653 624 HC$3.00 MF$0.65

LOW ENERGY ELECTRONS ON A FIELD LINE WITH A POTENTIAL MINIMUM,
Pennsylvania State Univ University Park Ionosphere Research Lab
Joseph M. Grebowsky. 20 Apr 67, 44p Rept no. Scientific-296
AFCRL-67-0328
Contract AF 19(628)-4014, Grant NSF-GP-5611

Descriptors: (*Energy, *Electrons), Electric fields, Magnetosphere, Magnetic fields, Electron density, Distribution functions, Equilibrium, Theory, Velocity, Thermal properties.

Although the component of electric field parallel to the earth's magnetic field lines is weak, it is important in considering the motion of low energy charged particles in the tail of the magnetosphere. This electric field is due to a process similar to the thermoelectric effect. At connection of the interplanetary and earth field lines on the dayside there is a minimum of electric potential. Model distribution functions are used to compute the electron density at several points on the line of force as a function of the local potential. The results can be used to determine the potential, when the electron density is known. (Author)
AD-653 639 HC$3.00 MF$0.65

ALGEBRAIC ASPECTS OF REGGE RECURRENCES,
Tel-Aviv Univ (Israel)
For primary bibliographic entry see Field 20J.
AD-653 684 Not available from CFSTI.

CURRENT ALGEBRAS AND THE DECAY 'OMEGA MESON TO PION (+) PION (-) GAMMA',
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
P. D. Conway. 9 Dec 66, 3p
AFOSR-67-1323
Grant AF-EOAR-36-65
Availability: Published in Physics Letters v24B n1 p59-60 Jan 9 1967.

Descriptors: (*Decay schemes, Algebras), (*Meson reactions, Selection rules), Pions, Gamma rays, Photons, Vector analysis, Great Britain.
Identifiers: Current algebras, Omega mesons.

The rare decay mode 'omega meson to pion (+) + pion (-) + gamma ray' of the omega meson is analysed using Weinberg's recent extension of the current algebra technique. The result is that the decay mode is forbidden which is not in agreement with experiment. Doubt is cast on certain assumptions in the analysis. (Author)
AD-653 707 Not available from CFSTI.

THE STUDY OF THE REACTION D (p,2p)n AT 46 MeV,
California Univ Los Angeles
I. Slaus, J. W. Verba, J. R. Richardson, L. S. August, and E. L. Petersen. 12 Oct 66, 3p
Contract Nonr-233 (44)
Prepared in cooperation with San Fernando Valley State Coll., Northridge, Calif.
Availability: Published in Physics Letters v23 n6 p358-60 Nov 7 1966.

Descriptors: (*Deuteron reactions, Nuclear spectroscopy), (*Proton reactions, Nuclear spectroscopy), Neutrons, Correlation techniques, Interactions, Nuclear scattering, Nuclear cross sections.

Correlation spectra from the p + d breakup reaction were measured at 46 MeV. The data, which show pronounced effects due to final state interactions and quasi-free processes, were analyzed in terms of three different spectator model calculations and the Chew-Low extrapolation procedure. (Author)
AD-653 759 Not available from CFSTI.

A STUDY OF THE NEUTRON - 3He INTERACTION AT 14.4 MeV,
California Univ Los Angeles
W. T. H. Van Oers, I. Slaus, B. Antolkovic, and M. Cerineo. 17 Oct 66, 3p
Contract Nonr-233 (44)
Prepared in cooperation with Institute 'B. Kidric', Belgrade, and Institute 'R. Boskovic', Zagreb.
Availability: Published in Physics Letters v23 n8 p477-9 Nov 21 1966.

Descriptors: (*Helium, Neutron reactions), (*Neutron reactions, Nuclear spectroscopy), (*Deuterons, Nuclear spectroscopy), Charged particles, Interactions, Nuclear energy levels, Excitation, Nuclear cross sections.

The interaction of 14.4 MeV neutrons with 3He nuclei was studied using a charged particle counter telescope set at zero degrees. An analysis of the 3He (n,d)np deuteron spectrum was performed. Evidence regarding a possible virtual state of the three-nucleon system is summarized. (Author)
AD-653 761 Not available from CFSTI.

MAGNETIC COMPRESSION OF ELECTRON BEAMS.
Hughes Research Labs Malibu Calif
For primary bibliographic entry see Field 9A.
AD-653 793 HC$3.00 MF$0.65

THRESHOLD BEHAVIOUR OF 3-BODY PARTIAL-WAVE AMPLITUDES-II,
Princeton Univ N J Palmer Physical Lab
For primary bibliographic entry see Field 20J.
AD-653 802 Not available from CFSTI.

Kl3 FORM FACTORS AND THE PION CHARGE FORM FACTOR,
Harvard Univ Cambridge Mass Dept of Physics
For primary bibliographic entry see Field 20J.
AD-653 807 Not available from CFSTI.

ON THE METHOD OF DASHEN AND GELL-MANN,
Harvard Univ Cambridge Mass Lyman Lab of Physics
For primary bibliographic entry see Field 20J.
AD-653 809 Not available from CFSTI.

CAN THE SQUARE OF THE ISOTOPIC SPIN BE CONSERVED BUT NOT THE TOTAL ISOTOPIC SPIN,
California Univ Berkeley Dept of Physics
For primary bibliographic entry see Field 20J.
AD-653 810 Not available from CFSTI.

EXTRAPOLATION PROBLEM IN CURRENT ALGEBRA CALCULATIONS OF THE PION-PION SCATTERING LENGTHS,
Maryland Univ College Park Dept of Physics and Astronomy
Joseph Sucher, and Ching-Hung Woo. 28 Feb 67, 6p
AFOSR-67-1393
Grant AF-AFOSR-500-66
Availability: Published in Physical Review Letters v18 n17 p723-6 Apr 24 1967.

Descriptors: (*Pions, Nuclear scattering), (*Meson scattering, Algebras), K mesons, Decay schemes, Series, Vector analysis.
Identifiers: Current algebras, Partial conservation of axial-vector currents.

Comments are offered on the care needed in the interpretation of partially conserved axial-vector current smoothness conditions, in connection with an apparent contridiction with the use of a power-series representation in current-algebra calculations of pion-pion scattering lengths. The ambiguities that beset a determination of the pion-pion scattering lengths are emphasized through the use of specific examples.
AD-653 817 Not available from CFSTI.

REPRESENTATION MIXING IN U12,
Imperial Coll of Science and Technology London (England) Dept of Physics
For primary bibliographic entry see Field 20J.
AD-653 821 Not available from CFSTI.

RESONANCE DECAYS FROM O (3,1) DYNAMICS. A REGULARITY IN THE PARTIAL DECAY WIDTHS,
Colorado Univ Boulder Dept of Physics
A. O. Barut, and Hagen Kleinert. 13 Feb 67, 6p
AFOSR-67-1366
Grant AF-AFOSR-30-65
Availability: Published in Physical Review Letters v18 n18 p754-6 May 1 1967.

Descriptors: (*Baryons, Resonance), Antiparticles, Hilbert space, Elementary particles, Probability, Mesons, Spin, Ground state.

We have evaluated in closed form the scalar form factors in an irreducible representation of the non-compact group O (3,1) containing antiparticles. In particular, we have calculated the decay of baryon resonances into the ground state and compared it with experiment. (Author)
AD-653 832 Not available from CFSTI.

THEORY OF ELEMENTARY PARTICLE AND NUCLEAR PHYSICS.
Semiannual progress rept., 30 Sep 66-1 Apr 67,
Colorado Univ Boulder Dept of Physics and Astrophysics
Joseph Dreitlein. 5 May 67, 7p
Contract N00014-67-A-0405-0001

Descriptors: (*Elementary particles, Theory), Regge poles, Particle trajectories, Meson reactions, Decay schemes, Algebras, Interactions.
Identifiers: Current algebras, ETA mesons.

A brief summary is given of work completed on Regge trajectories and on ETA meson decay; and of work in progress on current algebras and on the three-body problem.
AD-653 866 HC$3.00 MF$0.65

ELECTROMAGNETIC MASSES OF PSEUDOSCALAR MESONS.
Harvard Univ Cambridge Mass Dept of Physics
For primary bibliographic entry see Field 20J.
AD-653 906 Not available from CFSTI.

CURRENT ALGEBRAS IN A PERTURBATION-THEORETIC MODEL,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
For primary bibliographic entry see Field 20J.
AD-653 908 Not available from CFSTI.

NONSIMPLE PHYSICAL-REGION SINGULARITIES OF THE S-MATRIX,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
For primary bibliographic entry see Field 20J.
AD-653 909 Not available from CFSTI.

ANGULAR FUNCTIONS FOR A THREE-NUCLEON SYSTEM,
New South Wales Univ Kensington (Australia) Dept of Applied Mathematics
B. Davies. 14 Feb 66, 12p
AFOSR-67-1356
Grant AF-AFOSR-685-64
See also AD-653 914.
Availability: Published in Nuclear Physics v88 p361-72 1966.

Descriptors: (*Wave functions, *Euler's angles), (*Nucleons, *N-body problem), Gravity, Geometry, Classification, Tensor analysis, Spin, Quantum mechanics, Operators (Mathematics).

Angular functions are developed which are suitable for writing down trial functions for variational and other types of calculations for a three-body nucleus. They are expressed in terms of a simple set of functions for the problem.
AD-653 911 Not available from CFSTI.

MATRIX ELEMENTS FOR A THREE-NUCLEON SYSTEM (I),
New South Wales Univ Kensington (Australia) Dept of Applied Mathematics
B. Davies. 4 Mar 65, 15p
AFOSR-67-1360
Grant AF-AFOSR-685-64
See also AD-653 911.
Availability: Published in Nuclear Physics v73 p193-205 1965.

Descriptors: (*Nucleons, *N-body problem), (*Quantum mechanics, *Inequalities), Kinetic energy, Wave functions, Spin, Euler's angles, Classification, Momentum, Hamiltonian.

Matrix elements of the kinetic energy and some common potential energy operators are given for the three-nucleon system, using a classification of the wave function. The matrix elements, which are functions of the interparticle distances only, are given for arbitrary states of the system.
AD-653 912 Not available from CFSTI.

MATRIX ELEMENTS FOR A THREE-NUCLEON SYSTEM (II),
New South Wales Univ Kensington (Australia) Dept of Applied Mathematics
B. Davies. 11 Oct 65, 12p
AFOSR-67-1359
Grant AF-AFOSR-685-64
See also AD-653 912.
Availability: Published in Nuclear Physics v79 p427-36 1966.

Descriptors: (*Nucleons, *Operators (Mathematics)), (*Kinetic energy, *Tensor analysis), Matrix algebra, Euler's angles, N-body problem, Momentum, Spin, Programming languages.

The results include matrix elements of three velocity-dependent operators. The matrix elements are given for arbitrary states of the system.
AD-653 914 Not available from CFSTI.

A POSSIBLE STRUCTURE FOR C-VIOLATING ELECTROMAGNETIC INTERACTIONS,
Boston Univ Mass Dept of Physics
For primary bibliographic entry see Field 20J.
AD-653 919 Not available from CFSTI.

VIRTUAL COULOMB EXCITATION IN NUCLEON TRANSFER,
Yale Univ New Haven Conn Dept of Physics
G. Breit. 1967, 9p
AFOSR-67-1345
Grant AF-AFOSR-394-66
Availability: Published in Proceedings of the National Academy of Sciences v57 n4 p849-55 Apr 1967.

Descriptors: (*Nucleons, Nuclear reactions), (*Nitrogen, *Nuclear energy levels), Neutrons, Ground state, Excitation, Wave functions, Nuclear spectroscopy.

Estimates of the effect of virtual Coulomb excitation (VCE) on nucleon transfer reactions are made with particular attention to low-energy data for N14 (N14,N13) N15. A justification for making part of the calculation on an essentially semiclassical basis is formulated. If the effect of rapid phase variations of the Coulomb-excited wave function is omitted, the effect of VCE on neutron transfer takes on values similar to some early estimates. If the rapid phase variations are taken into account, this VCE contribution drops to values much smaller than those expected from the tunneling process. Data interpretation is therefore simplified. The reduction of contributions to the VCE nucleon transfer effect from the region of space contributing mostly to tunneling is so strong that the establishment of true upper limits is not claimed. The main reason for regarding VCE as a probable complicating influence has been removed, however. (Author)
AD-653 921 Not available from CFSTI.

OBSERVATIONS OF CENTRIFUGAL STRETCHING IN Sm152,
Massachusetts Inst of Tech Cambridge National Magnet Lab
Richard B. Frankel, D. Yeboah-Amankwah, and L. Grodzins. 27 Mar 67, 5p Rept no. JP-243
AFOSR-67-1446
Contract F44620-67-C-0047
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge. Lab. for Nuclear Science.
Availability: Published in Physical Review Letters v18 n19 p791-4 May 8 1967.

Descriptors: (*Samarium, *Isomeric transitions), Mossbauer effect, Experimental data, Nuclear models, Nuclear properties.

An isomer shift has been observed in the Mossbauer study of the 121.8-keV (2+ -- 0+) transition in Sm152. A value of (delta (R squared)/ (R squared)) subscript (2-0) = (10 + or -3) x 10 to the -4th power is deduced, based on isotope shift data for Sm152. This value disagrees with present theoretical prediction. In particular, the influence of the beta band in Sm152 can only account for about 20% of the observed stretching.
AD-653 929 Not available from CFSTI.

CALCULATION OF PARTICLE-HOLE STATES IN THE 2s-1d SHELL,
Michigan Univ Ann Arbor Dept of Physics
T. Engeland, and P. J. Ellis. 1967, 11p
Contract Nonr-1224 (59)

Descriptors: (*Nuclear shell models, Numerical analysis), (*Nuclear spectroscopy, Numerical analysis), Nuclear energy levels, Oxygen, Fluorine, Neon, Isotopes, Elementary particles.

A method was developed for calculating the positions of the particle-hole states in the sd-shell. Configurations with up to 4 holes were included. Results are presented for the nuclei oxygen-16 to neon-20. (Author)
AD-653 978 HC$3.00 MF$0.65

MOSSBAUER SPECTRA AND EFFECTIVE FIELD PARAMETERS IN IRON COMPOUNDS,
Boston Univ Mass Dept of Physics
For primary bibliographic entry see Field 7E.
AD-654 044 HC$3.00 MF$0.65

PROPAGATION OF SOME SYSTEMATIC ERRORS IN X-RAY LINE PROFILE ANALYSIS.
Georgia Inst of Tech Atlanta Engineering Experiment Station
For primary bibliographic entry see Field 12A.
AD-654 052 Not available from CFSTI.

Group 20H—Particle physics

REGGE POLES AND UNEQUAL-MASS SCATTERING PROCESSES,
California Univ Berkeley
Daniel Z. Freedman, and Jiunn-Ming Wang. 18 Jul 66, 16p
AFOSR-67-1405
Grant AF-AFOSR-232-66
Availability: Published in Physical Review v153 n5 p1596-1609 Jan 25 1967.

Descriptors: (*Regge poles, Theory), (*Particle trajectories, Scattering), Interactions, Mesons, Nuclear particles, Mathematical analysis, Nuclear models.
Identifiers: Strong interactions.

It is not clear from the Regge representation that the asymptotic form s raised to the power alpha (u) holds in the backward scattering of unequal-mass particles, because the cosine of the u-channel scattering angle remains small as s increases. In this paper we use a representation for the scattering amplitude first suggested by Khuri to show that the form s raised to the power alpha (u) is valid throughout the backward region.
AD-654 066 Not available from CFSTI.

PHASE-SHIFT ANALYSIS OF ELASTIC NUCLEON-DEUTERON SCATTERING,
California Univ Los Angeles Dept of Physics
W. T. H. Van Oers, and K. W. Brockman, Jr. 13 Sep 66, 23p
Contract Nonr-233 (44)
Prepared in cooperation with Instituut voor Kernphysisch Onderzoek, Amsterdam (Netherlands).
Availability: Published in Nuclear Physics v92 n3 p561-83 1967.

Descriptors: (*Deuterons, Elastic scattering), (*Nucleons, Elastic scattering), (*Elastic scattering, Phase shift), Nuclear cross sections, Neutron scattering, Proton scattering, Polarization.

Using the approach of Christian and Gammel, a phase-shift analysis was performed on existing elastic nucleon-deuteron scattering data in the energy range 1-40 MeV. As contrasted with the previous work of Christian and Gammel, the lower order phase shifts were taken to be complex for incident nucleon energies above 3.3 MeV. To guarantee as much as possible a meaningful result, the deuteron total disintegration cross section was included in the calculations. Tensor and spin-orbit forces were ignored and therefore splitting of the phase shifts was not taken into account. The 4S, 2S, 4P and 2P phase shifts found have a reasonable energy dependence; for decreasing energy they converge to the results of Christian and Gammel. (Author)
AD-654 070 Not available from CFSTI.

DECAY OF 102Ag AND LEVELS IN 102Pd,
California Univ Los Angeles Dept of Physics
For primary bibliographic entry see Field 18H.
AD-654 071 Not available from CFSTI.

ON THE DECAY OF 106In,
California Univ Los Angeles Dept of Physics
R. C. C. Catura, and J. Reginald Richardson. 6 Dec 65, 10p
Contract Nonr-233 (44)
Availability: Published in Nuclear Physics v82 p471-80 1966.

Descriptors: (*Indium, Radioactive decay), Cadmium, Nuclear physics, Half life, Gamma-ray spectra, Nuclear isomers, Measurement.

The half-life for decay of 106In has been measured to be 5.3 plus or minus 0.1 min. A magnetic lens spectrometer was used to investigate the positon spectrum of this isotope. Two positon components were found whose transition energies are 4.89 plus or minus 0.03 and 2.7 plus or minus 0.1 MeV. Seven gamma rays involved in the decay of 106In have been resolved at energies of 0.53, 0.63, 0.86, 0.99, 1.66, 1.88 and 2.2 MeV. Beta-gamma coincidence measurements indicate the highest energy position component to be coincident with only the 0.63 MeV gamma ray. In addition, the 2.7 MeV positon transition is coincident with gamma rays at 0.63, 0.86, 0.99, 1.66 and 1.88 MeV. The gamma rays at 0.63, 0.86 and 0.99 MeV were measured to be in coincidence. A search was made for the presence of an isomeric state in the decay of 106In with a half-life in the range from 0.5 sec to several hours. The investigation produced no evidence for the existence of such a state. (Author)
AD-654 072 Not available from CFSTI.

APPROXIMATE ELECTRON RADIAL FUNCTIONS FOR BETA DECAY AND ANALYSIS OF 12B AND 12N SPECTRA,
Alabama Univ University Dept of Physics
J. N. Huffaker, and C. E. Laird. 4 Oct 66, 12p
AROD-4819:2
Grant DA-ARO (D)-31-124-G664
Availability: Published in Nuclear Physics vA92 p584-92 1967.

Descriptors: (*Beta decay, Mathematical analysis), Boron, Nitrogen, Approximation (Mathematics), Radioactive isotopes.
Identifiers: Radial functions (Electron).

Electron radial functions for a uniformly charged nucleus are approximated to order (alpha Z)squared and compared with point-charge-nucleus functions and tabulated 'exact' functions. The accuracy and utility of these approximations is demonstrated with an analysis of 12B and 12N beta-decay spectra. It is suggested that some published tables of positon functions may be in error. (Author)
AD-654 087 Not available from CFSTI.

PULSED NUCLEAR MAGNETIC RESONANCE IN ROTATING SOLIDS,
Washington Univ St Louis Mo Dept of Physics
H. Kessemeier, and R. E. Norberg. Oct 66, 19p
AFOSR-67-1416
Grant AF-AFOSR-1119-66
Availability: Published in Physical Review v155 n2 p321-37 Mar 10 1967.

Descriptors: (*Nuclear magnetic resonance, Measurement), Rotation, Solids, Relaxation time, Nuclear spins, Phosphorus, Aluminum, Magnesium compounds, Zinc compounds, Aluminum compounds, Experimental data, Phosphides.

Pulsed nuclear-magnetic-resonance measurements have been made on rapidly rotating solid samples. Transient induction signals were observed for P31 and Al27 nuclei in Mg3P2, Zn3P2 and AlP powders. A stochastic theory of relaxation is used to discuss the transverse and longitudinal spin relaxation processes. Indirect nuclear exchange appears to limit the relaxation times T1 and T2 at high rotation rates. (Author)
AD-654 [illegible] Not available from CFSTI.

ENERGY LEVELS IN 23Na,
California Inst of Tech Pasadena
J. Dubois. 1966, 14p
Contract Nonr-220 (47)

Descriptors: (*Nuclear energy levels, *Sodium), Magnesium, Nuclear reactions, Experimental data, Deuterons, Alpha particles.

The energy levels in 23Na have been investigated by means of the reaction 25Mg (d, alpha)23Na. Deuterons with energy of 10.0 MeV were accelerated with the ONR-CIT tandem accelerator and the reaction products were analyzed with a double-focusing magnetic spectrometer at 20 degrees, 30 degrees, and 60 degrees. The level density agrees with that for 23Mg. No evidence for levels at 2.405 and 2.870 MeV in 23Na was found. (Author)
AD-654 153 HC$3.00 MF$0.65

A STUDY OF LEVELS IN 23Mg,
California Inst of Tech Pasadena
J. Dubois, and L. G. Earwaker. 1966, 50p
Contract Nonr-220 (47)

Descriptors: (*Nuclear energy levels, *Magnesium), Alpha particles, Nuclear models, Experimental data, Nuclear reactions, Nuclear spins, [illegible]arity, Gamma-ray spectra.

Levels in 23Mg with excitation energies up to 6.8 MeV have been investigated by magnetic analysis of the alpha particles from the reaction 24Mg (3He, alpha)23Mg at bombarding energies between 6 and 12 MeV. Between 4.4 and 6.8-MeV excitation energy, 16 new levels were found in 23Mg. [illegible]ngular distributions of the emitted alpha particles were measured and from DWBA analysis l-values for the picked up neutrons were obtained. The particle-gam a angular correlation method of Litherland and Ferguson was used to obtain additional information on the spin assignments of the levels as well as branching and mixing ratios of the gamma-ray transitions. The following spin and parity assignments have been established: 0.451 MeV 5/2 (+), 2.048 MeV 7/2 (3/2), 2.356 MeV 1/2 (+), 2.768 MeV (1/2, 3/2)(-), 2.904 MeV (3/2, 5/2) (+), 3.792 MeV 3/2 (-), 4.353 MeV 1/2 (+), 5.289 MeV (3/2, 5/2) (+), and 5.992 MeV (1/2, 3/2) (-). The experimental results are compared with those obtained for 23Na and the predictions of the collective model. (Author)
AD-654 155 HC$3.00 MF$0.65

NUCLEAR ENERGY LEVELS OF 37K,
California Inst of Tech Pasadena
D. R. Goosman, and R. W. Kavanagh. 1966, 102p
Contract Nonr-220 (47)

Descriptors: (*Nuclear energy levels, Potassium), Half life, Nuclear spins, Parity, Astrophysics, Neutrinos, Nuclear physics, Experimental data, Gamma-ray spectra.

Approximately forty levels in 37K have been established via various nuclear [illegible]eactions. Measurements of capture-gamma-ray energies with Ge (Li) counters have made possible the determination of several level energies with precisions ranging from 1 to 5 keV. The analogues in 37K of the first two excited levels in 37Ar were found as a closely spaced doublet at 1368 and 1380 keV excitation energy. The half-life of the latter has been measured electronically to be 9.6 plus or minus 1.4 nsec. The energies (in keV), spins, and parities of the lowest eight levels are given. Spin and parity assignments to other levels are also presented. Approximate values for the elastic and inelastic proton and gamma-ray widths of several levels have been determined. Evidence regarding the spins, parities, and widths of two candidates for the lowest T = 3/2 level is presented. The Q-value for 36Ar (p, gamma) is 1857.0 plus or minus 1.4 keV and the mass excess of 37K on t [illegible]e 12C = 0 scale is - 24799.6 plus or minus 2.7 keV.
AD-654 156 HC$3.00 MF$0.65

STOCHASTIC PROBLEMS I TRANSPORT THEORY,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 12A.
For abstract, see NSA 21 13.
ANL-7131 HC$3.00 MF$0.65

PHYSICS DIVISION SUMMARY REPORT. ANNUAL REVIEW, APRIL 1, 1965-MARCH 31, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18D.

For abstract, see NSA 21 13.
ANL-7246 HC$3.00 MF$0.65

REACTOR PHYSICS DEPARTMENT TECHNICAL ACTIVITIES QUARTERLY REPORT, JULY-SEPTEMBER 1966.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 13.
BNWL-340 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 7. NUMBER 2,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 21 13.
BNWL-411 HC$3.00 MF$0.65

MATRIX A FORCE CONSTANT ADJUSTER PROGRAM TO OBTAIN LEAST SQUARES FIT TO OBSERVED FREQUENCIES OF MOLECULES AND CRYSTALS,
Idaho Nuclear Corp., Idaho Falls.
J. K. Boyter, and H. L. McMurry. Apr 67, 12p
Contract AT (10-1)-1230

Descriptors: (*Molecules, *Crystals), (*Least squares method, *Programming languages), Matrix algebra, Diamonds.

For abstract, see NSA 21 13.
IN-1077 HC$3.00 MF$0.65

DESIGN AND OPERATION OF A SLOW NEUTRON CHOPPER,
Ames Lab., Iowa.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
IS-1544 HC$3.00 MF$0.65

TIME-OF-FLIGHT NEUTRON CROSS SECTION MEASUREMENTS USING NUCLEAR EXPLOSIONS. PART II,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18C.
For abstract, see NSA 21 13.
LA-3478 HC$3.00 MF$0.65

KILOVOLT EUROPIUM CAPTURE CROSS SECTIONS,
Los Alamos Scientific Lab., N. Mex.
Donald W. Barr, and Joseph J. Devaney.15 Dec 66, 51p
Contract W-7405-eng-36

Descriptors: (*Europium, *Nuclear cross sections), (*Radiochemistry, Neutrons), Debris, Odd-even nuclei, Odd-odd nuclei.

For abstract, see NSA 21 13.
LA-3643 HC$3.00 MF$0.65

A NOTE ON THE THREE-BODY TREATMENT FOR RE-ARRANGEMENT COLLISIONS.
International Centre for Theoretical Physics, Trieste (Italy).
A. Y. Abul-magd. Mar 67, 2p IC-67-15
Refs Submitted for Publication

Descriptors: *Amplitude, *Collision, *Iteration, *Three-body problem, Body, Coupled, Elementary, Equation, Particle, Problem, Rearrangement, Scattering, Three, Transition.

For abstract, see STAR 05 15.
N67-27808 HC$3.00 MF$0.65

ANNUAL VARIATIONS OF COSMIC RAYS AND INTENSITY VARIATIONS OF COSMIC RADIATION AS A FUNCTION OF EARTH'S HELIOLATITUDE.
Volt Technical Corp., Washington, D. C.
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 15.
N67-28007 HC$3.00 MF$0.65

AN UPPER LIMIT ON THE QUIET TIME SOLAR NEUTRON FLUX AT ENERGIES GREATER THAN 60 ME V.
Minnesota Univ., Minneapolis. School of Physics and Astronomy.
For primary bibliographic entry see Field 3B.
For abstract, see STAR 05 15.
N67-28020 HC$3.00 MF$0.65

SUM RULES AND THE ELECTROMAGNETIC ISOBAR- NUCLEON CURRENT.
International Centre for Theoretical Physics, Trieste (Italy).
C. G. Bollini, and J. J. Giambiagi. 3 Mar 67, 10p
IC-67-11
P Refs Submitted for Publication

Descriptors: *Coupling constant, *Electromagnetic field, *Form factor, *Isobar, *Nucleon, *Photoproduction, *Sum, Calculation, Constant, Coupling, Current, Electromagnet c, Factor, Field, Form, Product, Resonance, Scalar, Vector.

For abstract, see STAR 05 15.
N67-28701 HC$3.00 MF$0.65

ATOMIC SPECTROSCOPY WITH THE SHOCK TUBE.
Maryland Univ., College Park.
R. Bengtson, G. Charatis, D. Koopman, M. Miller, and T. Wilkerson. May 67, 30p NASA-CR-84796, BN-508
Grant NSG-359
Presented At 6th Intern. Shock Tube Sy p., Freiburg, W. Germany, 12-14 Apr. 1967 Submitted for Publication

Descriptors: *Gas spectroscopy, *Light element, *Shock tunnel, *Transition probability, Atom, Carbon, Dynamics, Element, Excitation, Fluid, Gas, Ion, Ionization, Light, Neon, Probability, Shock, Spectroscopy, Spectrum, Transition, Tunnel.

For abstract, see STAR 05 15.
N67-28764 HC$3.00 MF$0.65

LAMBDA- P SCATTERING AND LAMBDA- N INTERACTION.
International Centre for Theoretical Physics, Trieste (Italy).
S. Ali, M. E. Grypeos, and L. P. Kok. Mar 67, 16p IC-67-16

Descriptors: *Hyperon, *Neutron, *Nuclear interaction, *Proton, *Scattering, Baryon, Hypernucleus, Interaction, Lambda, Nuclear, Physics, Theoretical, Yukawa potential.

For abstract, see STAR 05 15.
N67-28801 HC$3.00 MF$0.65

SCATTERING OF NEUTRONS BY AN ANHARMONIC CRYSTAL.
Aktiebolaget Atomenergi, Stockholm (Sweden).
L. Bohlin, I. Ebbsjoe, and T. Hoegberg. Apr 67, 38p AE-274

Descriptors: *Crystal lattice, *Neutron scattering, *Numerical analysis, Analysis, Crystal, Energy, Frequency, Heat, Krypton, Lattice, Neutron, Numerical, Phonon, Scattering, Shift, Spectrum.

For abstract, see STAR 05 15.
N67-28803 HC$3.00 MF$0.65

ANALYTIC REPRESENTATION OF NONELASTIC CROSS SECTIONS AND PARTICLE-EMISSION SPECTRA FROM NUCLEON-NUCLEUS COLLISIONS IN THE ENERGY RANGE 25 TO 400 MEV,
Oak Ridge National Lab., Tenn.
R. G. Alsmiller, Jr., M. Leimdorfer, and J. Barish. Apr 67, 126p
Contract W-7405-eng-26

Descriptors: (*Neutrons, *Protons), (*Least squares method, *Monte Carlo method), Chemical elements, Emissivity, Nuclear cross sections, Energy, Nuclear particles, Tables.

For abstract, see NSA 21 13.
ORNL-4046 HC$3.00 MF$0.65

TWO-MILE ACCELERATOR PROJECT.
Stanford Linear Accelerator Center, Calif.
For primary bibliographic entry see Field 20G.
For abstract, see NSA 21 13.
SLAC-71 HC$3.00 MF$0.65

TEUTA KINEMATICAL ANALYSIS PROGRAM FOR COLLIDING BEAM EVENTS,
Stanford Linear Accelerator Center, Calif.
I. Derado, and R. Leedy. Feb 67, 30p
Contract AT (04-3)-515

Descriptors: (*Kinematics, *Particle beams), (*Nuclear scattering, *Programming languages), Input-output devices, Least squares method.

For abstract, see NSA 21 13.
SLAC-72 HC$3.00 MF$0.65

APPLICATION OF CHARGE INDEPENDENCE TO NEUTRON INELASTIC SCATTERING,
California Univ., Livermore. Lawrence Radiation Lab.
John D. Anderson, Calvin Wong, and Victor A. Madsen. 27Feb 67, 11p
Contract W-7405-eng-48

Descriptors: (*Inelastic scattering, *Nuclear reactions), (*Neutron cross sections, *Approximation (Mathematics)), Nuclear particles, Interactions, Exchange reactions, Interactions.

For abstract, see NSA 21 13.
UCRL-50197 HC$3.00 MF$0.65

20I. PLASMA PHYSICS

IONIZATION RATES IN THE INERT GASES.
Revised ed.,
University Coll Cork (Ireland) Dept of Electrical Engineering
Cyril J. Burkley, and Michael C. Sexton. 9 Dec 66, 5p
AFOSR-67-1341
Grant AF-EOAR-46-65
Revision of manuscript submitted 7 Oct 66.
Availability: Published in British Journal of Applied Physics v18 p443-5 Apr 1967.

Descriptors: (*Helium group gases, Gas ionization), (*Plasma medium, Helium group gases), Discharge tubes, Probes, Microwave frequency, Helium, Argon, Xenon, Electrons, Ions, Diffusion, Eire.

A microwave technique was used to determine the ionization rate alpha (defined as the number of electron-ion pairs produced by an electron per second) in helium, argon and xenon plasmas. Close agreement has been obtained with ionization rates calculated from the 'free-fall' and diffusion theories. (Author)
AD-653 478 Not available from CFSTI.

Group 20I—Plasma physics

IONIC-MOLECULAR REACTIONS OF HYDROGEN WITH NOBLE GASES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7D.
AD-653 510 HC$3.00 MF$0.65

PHYSICAL GAS DYNAMICS, HEAT TRANSFER AND THERMODYNAMICS OF HIGH TEMPERATURE GASES: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-653 513 HC$3.00 MF$0.65

INCOHERENT SCATTERING OF MICROWAVES FROM ENHANCED DENSITY FLUCTUATIONS IN A DC DISCHARGE,
Illinois Univ Urbana Coordinated Science Lab
Wayne Elbert Carr. May 67, 78p Rept no. R-352
Contract DA- 8-043-AMC-00073 (E)

Descriptors: (*Incoherent scattering, *Microwaves), (*Plasma physics, Incoherent scattering), Plasma oscillations, Electron density, Gases, Pressure, Thermal properties, Langmuir probes, Neon, Direct current, L band, Equilibrium, Thermodynamics, Measurement.

Radiation of 9375 MHz is incident on a cylindrical neon discharge enclosed in a 1 inch square waveguide and incoherent scattering in the upper sideband is investigated. Scattering is observed in the backward and forward directions from the naturally enhanced density fluctuations in two electron plasma modes for gas pressures between 3.8 0.001 Toor and 8.0X0.001 Toor. The measured electron mode frequencies are in general agreement with other experiments. The enhancement, varying between 30 and 8000 times the estimated thermal value is correlated over most of the pressure range to excess super-thermal electrons present in the discharge, as measured by a Langmuir probe. (Author)
AD-653 521 HC$3.00 MF$0.65

SYNTHESIS OF ACETYLENE IN A PLASMA JET,
Foreign Technology Div Wright-Patterson AFB Ohio
S. Mints, A. Shimanski, and S. Varykha. 22 Mar 67, 13p Rept no. FTD-MT-65-540
TT-67-62107
Edited machine trans. of mono. Sintez Atsetilena v Strue Plazmy, Moscow, 1965 8p.

Descriptors: (*Alkynes, Synthesis (Chemistry)), (*Plasma jets, Argon), Methane, Gas discharges, Efficiency, Thermochemistry, USSR.

The invention and practical use of a new type of electric discharge - the vortex gas stabilized arc discharge - have opened a new approach to the study of several chemical endothermic processes, one of which is synthesis of acetylene from methane in an argon plasma jet. The acetylene content in effluent gases reaches 12%, which indicates that in case of reduction of energy consumption per 1 cu m (NTP) this technique may successfully compete with other methods of acetylene production. The study was conducted to determine the best conditions of conversion of methane into acetylene in an argon plasma jet. A plasma jet equipped with a tungsten cathode and copper anode (nozzle) was investigated. Methane was introduced just below the anode or directly into the nozzle. The post-reaction mixture was cooled in a water cooler attached directly to the anode. Results of investigations indicated that for power input between 6 and 10 kw and at constant argon flow the best effeciency is obtained for methane content from 20 to 35%. For these conditions the power yield of 22 kw-hr/cu m (NTP) of acetylene was obtained. The conversion of methane to acetylene was then between 50 and 80%. Influence of method and place of methane feeding and cooling arrangement on efficiency of the process was observed. (Author)
AD-653 539 HC$3.00 MF$0.65

THERMODYNAMIC AND GAS-DYNAMIC PARAMETERS OF LOW-TEMPERATURE PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
T. V. Bazhenova, S. G. Zaitsev, A. A. Konkov, Yu. V. Makarov, and A. S. Pleahanov. 21 Mar 67, 18p Rept no. FTD-MT-65-526
TT-67-62111
Edited machine trans. of mono. Thermodinamicheskie i Gazodinamicheskie Parametry Nizkotemperaturnoi Plazmy, Moscow, 1965 12p.

Descriptors: (*Plasma medium, Dynamics), Thermodynamics, Gas flow, Shock tubes, Air, Carbon dioxide, Nitrogen, Alkali metals, Gas ionization, Reaction kinetics, Shock waves, USSR.

The report concerns results of calculations and experimental investigations of properties of low-temperature plasma on diaphragm and electromagnetic shock tubes. A description is given of the methods of experiment. As a result of the work, tables are compiled of thermodynamic and gas-dynamic parameters of air, carbon dioxide, nitrogen, and alkalai metals for temperatures of 1000-20,000K over a wide range of pressures. Certain experimental data are obtained on the nonequilibrium properties of plasma.
AD-653 553 HC$3.00 MF$0.65

INTRODUCTION OF PLASMA TECHNOLOGY IN THE CHEMICAL AND METALLURGICAL INDUSTRY,
Foreign Technology Div Wright-Patterson AFB Ohio
V. Bzhozovskii, Ya. Reda, and M. Mikes. 21 Mar 67, 24p Rept no. FTD-MT-65-527
TT-67-62112
Edited machine trans. of mono. Vnedrenie Plazmennoi Tekhniki v Khimicheskuyu i Metallurgicheskuyu Promyshlennosti, Moscow, 1965 27p.

Descriptors: (*Plasma generators, Nitrogen), (*Chemical industry, Plasma physics), (*Metallurgy, Plasma physics), Installation, Laminar flow, Cutting, Coatings, Refractory materials, Plasma jets, Ignition, USSR.
Identifiers: Plasma guns.

Installations with power from 30 to 100 kw which create plasma from argon, nitrogen, argon-hydrogen and nitrogen-water mixtures have been developed. The operation and parameters obtained at an installation with the power of 100 kw operating on nitrogen are described. The installation's contents are listed, mainly featuring a plasma gun. The gun's use is described in great detail and problems in its use are listed. Laminar flow in plasmatrons are cited. Methods for igniting the plasmatron are described.
AD-653 554 HC$3.00 MF$0.65

EXPERIMENTAL DETERMINATION OF COEFFICIENT OF THERMAL CONDUCTIVITY OF A CESIUM PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
L. P. Zarkova, and B. I. Stefanov. 21 Ma 67, 20p Rept no. FTD-MT-65-529
TT-67-62113
Edited machine trans. of mono. Eksperimentalnoe Opredelenie Koeffitsienta Teploprovodnosti Tsezievoi Plazmy, Moscow, 1965 16p.

Descriptors: (*Plasma medium, Thermal conductivity), (*Cesium, Plasma medium), Pressure, Gas ionization, Heat transfer, Determination, Argon, Neon, Mercury, USSR.

The coefficient of thermal conductivity of cesium vapor in the temperature range of 1600-2400K and the pressure of 15 mm Hg are measured. In the region of 1000-1600K, the results do not depend on pressure, but there is a sharp growth of the coefficient of thermal conductivity observed caused by the ionization heat transfer depending on pressure. This excess 'ionization' coefficient of thermal conductivity depends on the coefficient of ambipolar diffusion of ions and electrons and also depends on the degree of ionization (and consequently on pressure). The coefficient of thermal conductivity of argon, neon and mercury vapor in the range of 1100-2200K were measured in the process of mastering the experimental method.
AD-653 555 HC$3.00 MF$0.65

CERTAIN CHARACTERISTICS OF A HIGH-FREQUENCY INDUCTION GAS DISCHARGE AND PECULIARITIES OF ITS APPLICATION FOR SYNTHESIS OF REFRACTORY DIELECTRIC CRYSTALS,
Foreign Technology Div Wright-Patterson AFB Ohio
K. K. Voronin, Z. M. Goldfarb, A. V. Donskoi, S. V. Dresvin, and V. S. Klubnikin. 22 Mar 67, 17p Rept no. FTD-MT-65-530
TT-67-62114
Edited machine trans. of mono. Nekotorye Kharakteristiki Vysokochastotnogo Induktsionnogo Gazovogo Razryada i Osobennosti ego Primeneniya dlya Sinteza Tugoplavkikh Kristallov Dielektrikov, Moscow, 1965 12p.

Descriptors: (*Plasma jets, Crystal growth), (*Refractory materials, *Dielectrics), Gas discharges, Synthesis, High frequency, Plasma generators, Argon, Recrystallization, USSR.
Identifiers: Plasma guns.

The article describes an experiment in which a plasma gun is used to synthesize crystals. High-frequency argon plasma guns with water-cooled quartz walls are investigated and the plasma jet produced by a gun with sectional metal walls is examined. Synthesis of crystals in a plasma jet by the Verneuil method and the zone recrystallization procedure is discussed.
AD-653 556 HC$3.00 MF$0.65

APPLICATION OF SPECTROSCOPIC METHODS FOR DIAGNOSTICS OF LOW TEMPERATURE PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
M. A. Elyashevich, L. I. Grechikhin, and L. I. Kiselevskii. 22 Mar 67, 14p Rept no. FTD-MT-65-539
TT-67-62115
Edited machine trans. of mono. Primenenie Spektroskopicheskikh Metodov dlya Diagnostiki Nizkotemperaturnoi Plazmy, Moscow, 1965 8p.

Descriptors: (*Plasma medium, Line spectrum), Charged particles, Density, Stark effect, Gas ionization, Spectroscopy, Copper, Magnesium, Aluminum, Alkali metals, USSR.
Identifiers: Plasma diagnostics.

The report states methods of determining concentrations of charged particles in low temperature plasma according to measurement of broadening of spectral lines caused by quadratic Stark effect, measurements of intensities of forbidden spectral lines which appear under action of intermolecular electric fields, and intensities of autoionization spectral lines.
AD-653 557 HC$3.00 MF$0.65

PLASMA PROCESSES IN METALLURGY AND PROCESSING OF MATERIALS,
Foreign Technology Div Wright-Patterson AFB Ohio
N. N. Rykalin, and I. D. Kulagin. 23 Mar 67, 18p

Rept no. FTD-MT-65-543
TT-67-62129
Edited machine trans. of mono. Plazmennye Protsessy v Metallurgii i Obrabotke Materialov, Moscow, 1965 p1-12.

Descriptors: (*Plasma jets, *Metallurgy), Materials, Processing, Power, Enthalpy, Temperature, Efficiency, Cutting, Welding, Coatings, Melting, Processing, Refining (Metallurgy), Surfaces, USSR.

Methods of producing low-temperature plasma jets are considered. Energetic characteristics of plasma jets (power, enthalpy, temperature, efficiency) and methods for their approximate evaluation are given. Fields of plasma jet applications in material processing (cutting, welding, surfacing, coating, spheroidizing) and metallurgical processes (ore decomposition, oxide reduction, melting) are considered. (Author)
AD-653 558 HC$3.00 MF$0.65

ON CYCLINDRICAL ELECTRIC ARC THEORY TAKING INTO ACCOUNT ENERGY TRANSFER BY RADIATION,
Foreign Technology Div Wright-Patterson AFB Ohio
V. N. Vetlutskii, A. T. Onufriev, and V. G. Sevastyanenko. 22 Mar 67, 25p Rept no. FTD-MT-65-544
TT-67-62128
Edited machine trans. of mono. Raschet Tsilindricheskoi Elektricheskoi dugi s Uchetom Perenosa Energii Izlucheniem, Moscow, 1965 p1-28.

Descriptors: (*Plasma physics, *Hydrogen), (*Argon, Plasma physics), Equilibrium, Thermal conductivity, Kinetic theory, Ionization potentials, Electric arcs, Mathematical analysis, Graphics, Tables, USSR.

The article contains calculations of arc in argon and hydrogen stabilized by cooled walls of channel with consideration of radiation with usage of theoretically calculated dependences describing transport properties of plasma. Composition of argon and hydrogen plasma was determined by formulas of chemical equilibrium, taking into account lowering of ionization potential. Coefficients of electrical and thermal conductivity were conducted by formulas of kinetic theory. Elementary processes are listed which cause hydrogen plasma to radiate energy. The results of calculations on argon and hydrogen are expounded in detail. (Author)
AD-653 559 HC$3.00 MF$0.65

DIAGNOSTICS OF MAGNETOPLASMAS BY LARGE ANGLE LASER SCATTERING,
RCA Victor Co Ltd Montreal (Quebec) Research Labs
I. P. Shkarofsky. Jan 67, 113p
ARL-67-0020
Contract AF 33 (615)-2196

Descriptors: (*Plasma medium, Analysis), Distribution functions, Lasers, Coherent radiation, Scattering, Density, Cyclotron resonance phenomena, Canada.
Identifiers: Plasma diagnostics.

A review of experiments until 1967 on laser scattering from plasmas is given which indicates that any static magnetic field if present has not been utilized for diagnostics. The Appendix summarises the theory on scattering of electromagnetic waves from an infinite magnetoplasma with arbitrary velocity distributions for electrons and ions. It is shown that one can provide large angle scattering in the plane perpendicular to the magnetic field near certain electrostatic resonances, namely the upper hybrid (when the ratio of plasma to cyclotron frequency is greater than the sq. root of 3) and the cyclotron harmonics. The perpendicular wavenumbers associated with these magnetoplasma resonances can become large. Also the plasma resonance and upper hybrid resonance at low density are discussed. For densities 10 to the 12th power to 10 to the 13th power/cc, temperatures 2000 - 3000K, and using a 10.6 micron laser, the electron velocity distribution function is obtainable from the form of Landau damping acting on the plasma resonance, whereas collisional damping is usually stronger than cyclotron damping for the other resonances. Also the damping expression for the upper hybrid at high plasma densities suffers from complexities in analysis. All resonances are useful to yield electron density and temperature from the dispersion effects. (Author)
AD-653 584 HC$3.00 MF$0.65

A REVIEW OF DISPERSION RELATIONS FOR LOW FREQUENCY WAVES IN QUIESCENT MAGNETO PLASMAS,
Aerospace Research Labs Wright-Patterson AFB Ohio
Horst S. Anton, and Walter Friz. Mar 67, 22p
Rept no. ARL-67-0055

Descriptors: (*Plasma medium, Dispersion relations), (*Magnetohydrodynamics, Dispersion relations), Cyclotron waves, Scattering, Low frequency, Reviews, Containment, Cesium, Magnetic fields, Density, Ions.
Identifiers: Q machines, Alfven waves.

The work gives a summary of possible waves in a quiescent Cs-magneto plasma. Dispersion relations for the different low frequency waves are given graphically and the influence of external magnetic field strength and particle density is shown. (Author)
AD-653 589 HC$3.00 MF$0.65

CONSTRUCTION OF STEADY-STATE HYDROMAGNETIC DYNAMOS. II. THE SPHERICAL CONDUCTOR,
New York Univ N Y Magneto-Fluid Dynamics Div
Stephen Childress. 30 Mar 67, 54p Rept no. MF-54
AFOSR-67-0976
Grant AF-AFOSR-815-67
See also AD-652 249.

Descriptors: (*Magnetohydrodynamics, Mathematical models), Electromagnetic fields, Vector spaces, Inductance, Banach space, Perturbation theory, Fluid flow, Theorems.

The steady-state kinematic dynamo problem in a homogeneous sphere with concentric spherical fluid core is considered. The existence of a class of solenoidal dynamos satisfying a no-slip condition on the core boundary is proved by perturbing the discrete spectrum of a simpler self-adjoint comparison problem. The dynamos are of the form q = q (1) + q (2) + q (3) where q (1) is spatially periodic, q (2) is zero except in a neighborhood of the boundary of the core, and q (3) is an arbitrary sufficiently small motion. (Author)
AD-653 603 HC$3.00 MF$0.65

AN IDEALIZED PROBLEM WITH F2-LAYER APPLICATIONS,
Queen Mary Coll London (England)
For primary bibliographic entry see Field 4A.
AD-653 648 HC$3.00 MF$0.65

ACCELERATION ON A GALACTIC SCALE,
Stanford Univ Calif Inst for Plasma Research
For primary bibliographic entry see Field 3B.
AD-653 650 HC$3.00 MF$0.65

7A8-SPECTROSCOPIC STUDIES OF LASER-PRODUCED HYDROGEN plasma.
Meeting speech,
Massachusetts Inst of Tech Lexington Lincoln Lab
M. M. Litvak, and D. F. Edwards. 29 Apr 66, 8p
Rept no. MS-1554
ESD-TR-67-170
Contract AF 19 (628)-5167
Presented at International Quantum Electronics Conference, 1966, Phoenix, Ariz.
Availability: Published in IEEE Journal of Quantum Electronics vQE-2 n9 p486-92 1966.

Descriptors: (*Plasma generators, *Lasers), (*Plasma medium, Spectroscopy), Hydrogen, Cooling, Thermodynamics, Electron density, Recombination reactions, Atomic energy levels, Optical properties.

The decay of the temperature of the laser-produced discharge in hydrogen can be attributed to volume expansion and radiation cooling. The expansion rate compared well with calculated values for a spherical explosion modified by the counterpressure of the undisturbed gas. The plasma properties fit that of the hot core, with much higher temperatures and much lower mass densities than at the shock front. The temperature, for most initial pressures, levels off, as calculated, at a value sensitively determined by the balance of these cooling effects and the heating of the electron gas during recombination. The radiation cooling was taken to be mainly by recombination radiation and by line radiation with the exception of Lyman alpha. The observed decay of the electron density usually lies between that for the 3 body collisional-radiative recombination without any ground state ionization and that with the nearly equilibrium ionization rate subtracted out. And, because of volume expansion, the decay coefficient is correctly predicted to be about a factor of 3 to 4 above the net decay coefficient for collisional-radiative recombination minus nearly equilibrium ground state ionization. The laser absorption coefficient for inverse bremsstrahlung at thermal equilibrium was calculated to be at least an order of magnitude too small compared to experiment. (Author)
AD-653 676 Not available from CFSTI.

INSTABILITIES IN A DRIFTING SEMICONDUCTOR PLASMA,
Oxford Univ (England) Dept of Engineering Science
For primary bibliographic entry see Field 20L.
AD-653 819 Not available from CFSTI.

COLLISION-INDUCED DISSOCIATION OF D2 (+) IONS BY ARGON AND NITROGEN,
Florida Univ Gainesville Dept of Physics and Astronomy
For primary bibliographic entry see Field 7D.
AD-653 823 Not available from CFSTI.

EXPERIMENTAL INVESTIGATION OF HARMONIC ION CYCLOTRON WAVE PROPAGATION AND ATTENUATION.
Revised ed.,
Texas Univ Austin
Magne Kristiansen, and Arwin A. Dougal. 9 Dec 66, 11p
AFOSR-67-1364
Grant AF-AFOSR-766-67
Revision of manuscript submitted 29 Aug 66.
Availability: Published in The Physics of Fluids v10 n3 p596-604 Mar 1967.

Descriptors: (*Plasma oscillations, Propagation), (*Cyclotron resonance phenomena, *Magnetohydrodynamics), Attenuation, Ions, Hydrogen, Deuterium, Frequency, Heating, Thermodynamics.

A new wave phenomenon was observed in the course of an experimental investigation of ion cyclotron resonance heating of hydrogen and deuterium plasmas in strong magnetic fields. It was found that the waves can propagate for frequencies larger than the ion cyclotron frequency f sub c, and attenuate at harmonics of f sub c with resulting in-

crease in the transverse temperature-density product. The harmonic number at which the waves attenuate increases with increasing gas pressure. Attenuation at harmonics up to the 8th was observed. The plasma density is typically 6 x 10 to the 17th power/cu. m., the transverse plasma temperature < or = 50-eV equivalent, and the magnetic field 1-9 kG. A magnetic beach geometry is employed and the waves are excited by a Faraday shielded Stix coil from a 30 kW, 5.8 MHz driver. Harmonic cyclotron heating is related to large transverse wave numbers which are shown to exist in the experiment. (Author)
AD-653 834 Not available from CFSTI.

A PHYSICAL MODEL OF CYCLOTRON DAMPING,
Rand Corp Santa Monica Calif
R. F. Lutomirski. May 67, 22p Rept no. RM-5356-PR
Contract F44620-67-C-0045

Descriptors: (*Cyclotron resonance phenomena, Damping), (*Plasma medium, Propagation), Electromagnetic waves, Frequency, Plasma oscillations, Mathematical analysis, Distribution functions, Magnetohydrodynamics.

Consideration is given to the phenomenon of cyclotron damping (or growth) of an electromagnetic wave propagating parallel to an external magnetic field in a fully ionized plasma (e.g., in the whistler mode). The basic intent is to give a derivation of the damping (or growth) rate of the wave that is based on a physical model that yields insight into the origin of the phenomenon. Cyclotron damping is governed by the energy exchange between the wave and those particles that feel the wave doppler-shifted in frequency to their own cyclotron frequency. Further, the phenomenon is asymptotic in time in the sense that, within the framework of linear theory, a dispersion relation between frequency and wave number and a damping (or growth) rate exist for these waves only as t approaches infinity. The asymptotic behavior is discussed in the context of the suggested model, and an estimate of how long one must wait before the asymptotic solutions are valid, as well as the usual linearized results, is obtained. (Author)
AD-653 926 HC$3.00 MF$0.65

ABOUT HIGH-FREQUENCY OSCILLATIONS OF ELECTRONIC PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
A. I. Akhiezer, and Ya. B. Fainberg. 31 Mar 67, 16p Rept no. FTD-HT-66-494
TT-67-62149
O Vysokochastotnykh Kolebaniyakh Elektronnoi Plazmy, unedited rough draft trans. of Zhurnal Eksperimentalnoi i Teoreticheskoi Fiziki (USSR) v21 n11 p1262-9 1951.

Descriptors: (*Plasma oscillations, Particle beams), (*Particle beams, Interactions), High frequency, Charged particles, Electron density, Mathematical analysis, USSR.

The paper discusses the interaction of a beam of charged particles with an electron plasma. It is shown that the state of the beam, which is characterized by constant and uniform speed and density, turns out to be unstable. If such a beam goes into a plasma fluctuations in density and speed are formed in it and these are propagated in the form of a wave with increasing amplitude. The longitudinal field connected with it also has the character of a wave with increasing amplitude. (Author)
AD-653 966 HC$3.00 MF$0.65

WAVE PROPAGATION IN A NON-MAXWELLIAN MAGNETOACTIVE NONLINEAR PLASMA.
Final rept., 10 Jun 65-31 Oct 66,
Thomas (A S) Inc Westwood Mass
A. S. Thomas. May 67, 82p Rept no. M65-4FR
AFCRL-67-0319
Contract AF 19 (628)-5195

Descriptors: (*Plasma medium, Propagation), Magnetohydrodynamics, Cyclotron resonance phenomena, Nonlinear systems, Electromagnetic waves, Numerical analysis, Wave transmission, Reflectivity.

The interaction of an electromagnetic wave normally incident on a non-Maxwellian, nonlinear, magnetoactive, homogeneous plasma slab is studied. The wave is taken to be either right-hand circularly polarized or left-hand circularly polarized. First integral expressions for the conductivity are evaluated numerically as power series in field intensity. Then, using these expressions, the reflection and transmission coefficients are computed by employing the Runge-Kutta technique to integrate Maxwell's equations numerically step-by-step through the plasma slab. For most of the cases considered, the reflection and transmission coefficients decrease as the incident field increases. (Author)
AD-653 988 HC$3.00 MF$0.65

PLANE WAVE PROPAGATION THROUGH A COMPRESSIBLE INHOMOGENEOUS PLASMA,
Arizona Univ Tucson Engineering Experiment Station
Eric Rahneberg, and George Tyras. Mar 67, 31p Rept no. Scientific-4
AFCRL-67-0299
Contract AF 19 (62222 8)-3834

Descriptors: (*Plasma medium, Propagation), Magnetohydrodynamics, Differential equations, Compressive properties, Wave transmission.

The set of hydrodynamic equations together with Maxwell's equations which describe a nonuniform plasma as formulated by Cohen was applied to a two dimensional problem where the magnetic field has only one component which is transverse to the direction of propagation and the profile is of the form (e exp. -Bx). These assumptions lead to a set of second order coupled electromagnetic and hydrodynamic differential equations which describe the region under consideration. Solutions to this coupled set were obtained by the application of the method of Frobenius. Considerable simplification resulted in the solutions when the assumption that the rms velocity of the electrons is much smaller than the speed of light was made. The resulting set of approximate solutions was applied to the problem of obtaining reflection and transmission coefficients for the case of a plane wave incident from free space upon a layer of compressible inhomogeneous plasma. (Author)
AD-653 994 HC$3.00 MF$0.65

STUDY OF PLASMA SHEATH EFFECTS ON ANTENNAS.
Arizona Univ Tucson Engineering Experiment Station
For primary bibliographic entry see Field 9E.
AD-653 995 HC$3.00 MF$0.65

EXPERIMENTS ON TRANSVERSE IONIZING MHD SHOCK WAVES,
Frank J Seiler Research Lab United States Air Force Academy Colo
Charles F. Stebbins. May 67, 100p Rept no. SRL-67-0006

Descriptors: (*Magnetohydrodynamics, *Shock waves), Ionization, Equations of state, Magnetic fields, Electric fields, Shock tubes.

The jump conditions across a transverse ionizing MHD shock wave, where the magnetic field is in the plane of the shock, are examined. The simple conservation laws, in conjunction with Maxwell's laws and the equation of a state, yield three jump equations in four unknowns. The ionizing wave, then, requires an additional descriptive relationship for a unique solution to the jump equations to exist. Several theories which attempt to supply this missing relationship are examined including the theory of Lyubimov and Kulikovskii and later, Chu, where the internal structure of the shock, itself, supplies the missing relationship. In particular, Lyubimov and Kulikovskii show, for appropriate ratios of the thermal diffusivity to the magnetic diffusivity, that for low speed shock waves the magnetic field compression across the shock is unity and the jump equations reduce to the ordinary Rankine-Hugoniot relations. For high speed shock waves, the magnetic field compression is equal to the gas compression across the wave, and the jump equations became exactly the magnetohydrodynamic jump relations. Furthermore, intermediate speed shocks experience a magnetic field compression between 1 and rho sub 2/rho sub 1. (Author)
AD-654 013 HC$3.00 MF$0.65

PLASMA CYCLOTRON ECHOES.
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 20G.
AD-654 026 HC$3.00 MF$0.65

PHYSICS DIVISION SUMMARY REPORT. ANNUAL REVIEW, APRIL 1, 1965-MARCH 31, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 13.
ANL-7246 HC$3.00 MF$0.65

DYNAMICS OF CYLINDRICAL PLASMA SHELLS.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Laboratorio Gas Ionizzati.
G. B. Somon. Nov 66, 54p LGI-66-11
Sponsored in Part By Euratom

Descriptors: *Cylindrical shell, *Hugoniot adiabat, *Magnetic field, *Plasma dynamics, Acceleration, Adiabat, Compression, Cylinde , Deuterium, Dynamics, Field, Geometry, Liner, Magnetic, Model, Particle, Physics, Plasma, Shell, Shock, Wave.

For abstract, see STAR 05 15.
N67-27801 HC$3.00 MF$0.65

TURBULENT DIFFUSION DUE TO DRIFT INSTABILITY DRIVEN BY A TEMPERATURE GRADIENT.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Labo atorio Gas Ionizzati.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 15.
N67-27802 HC$3.00 MF$0.65

RELATION BETWEEN THE FUNDAMENTAL MODES, WITH AND WITHOUT MAGNETIC SHEAR, OF THE DRIF INSTABILITY DRIVEN BY A TEMPERATURE GRADIENT.
Comitato Nazionale er L Energia Nucleare, Frascati (Italy). Laboratorio Gas Ionizzati.
B. Coppi, and F. Engelmann. Feb 67, 20p LGI-67-3
Sponsored in Part By Euratom

Descriptors: *Magnetic field, *Plasma, *Propagation mode, *Temperature gradient, Drift, Field, Gradient, Instability, Magnetic, Mode, Perturbation, Physics, Propagation, Shear, Temperature, Wave.

For abstract, see STAR 05 15.
N67-27804 HC$3.00 MF$0.65

MOTION OF A PLASMA JET ACROSS A NONUNIFORM TRANSVERSE MAGNETIC FIELD.

Rukh Strumenya Plazmy Kriz' Neodnoridne Poperechne Magnitne Pole
Holman (John F.) and Co., Inc., Washington, D. C.
D. K. Goncharenko, V. P. Goncharenko, and K. D. Sinelnikov. Jun 67, 5p NASA-TT-F-11016
Contract NASW-1495
Transl. Into English From Ukr. Fiz. Zh. (iev), V. 11, No. 8, 1966 P 825-828

Descriptors: *Nonuniform magnetic field, *Particle motion, *Plasma jet, Clot, Cylinder, Dimension, Drift, Electric, Field, Gradient, Interaction, Jet, Magnetic, Moment, Motion, Nonuniform, Particle, Plasma, Poisson equation, Symmetry, Transverse.

For abstract, see STAR 05 15.
N67-28230 HC$3.00 MF$0.65

STATUS OF POROUS IONIZERS FOR CONTACT IONIZATION OF CESIUM.
National Aeronautics and Space Adm nistration. Lewis Research Center, Cleveland, Ohio.
L. C. Headley. Jun 67, 28p NASA-TN-D-3997
Contract 120-26-02-22

Descriptors: *Cesium engine, *Ionic propulsion, *Porous material, *Thrustor, Cesium, Characteristics, Comparison, Contact, Density, Diameter, Emission, Engine, Ionization, Material, Performance, Pore, Porosity, Propulsion, Sintering.

For abstract, see STAR 05 15.
N67-28298 HC$3.00 MF$0.65

RESONANT FREQUENCIES OF A DIELECTRIC SPHERE IMMERSED IN A WARM COLLISIONAL PLASMA.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
N. C. Wenger. Jun 67, 26p NASA-TN-D-4003
Contract 129-01-07-05-22

Descriptors: *Plasma oscillation, *Resonant frequency, *Sphere, Collision, Damping, Density, Dielectric, Electron, Factor, Frequency, Immersion, Oscillation, Plasma, Resonance, Solid, Temperature, Warm.

For abstract, see STAR 05 15.
N67-28300 HC$3.00 MF$0.65

THEORY OF TURBULENT PLASMA.
Teoriya Turbulentnoi Plazmy
Israel Program for Scientific Translations, Ltd., Jerusalem.
A. A. Vedenov. 1966, 101p
Transl. Into English From the Book "itogi Nauki - Fizika Plazmy" Moscow, 1965

Descriptors: *Plasma oscillation, *Plasma turbulence, Coefficient, Electromagnetic, Ionization, Oscillation, Particle, Physics, Plasma, Resonance, Scattering, Stability, Transport, Turbulence, U.S.S.R., Wave.

For abstract, see STAR 05 15.
N67-28374 HC$3.00 MF$0.65

20J. QUANTUM THEORY

ENERGY CALCULATION OF THE METASTABLE (1s2s2p)4Po STATE OF He (-) AND Li,
Oslo Univ (No way) Inst for Theoretical Physics
For primary bibliographic entry see Field 7D.
AD-653 433 Not available from CFSTI.

THE TWO USES OF NON-COMPACT GROUPS IN PARTICLE PHYSICS AND THEIR RELATIONS,
Colorado Univ Boulder
For primary bibliographic entry see Field 20H.
AD-653 473 Not available from CFSTI.

FIELD THEORETIC APPROACH TO ATOMIC HELIUM,
Uppsala Univ (Sweden) Quantum Chemistry Group
Donald H. Kobe. 25 Jun 66, 53p Rept no. Scientific-15
Contract AF 61 (052)-874
Availability: Published in Quantum Chemistry Group for Research in Atomic, Molecular and Solid-State Theory, Uppsala Univ. (Sweden). 53p nd Preprint-175.

Descriptors: (*Helium, *Field theory), (*Atomic energy levels, Field theory), Green's function, Perturbation theory, Hartree-Fock approximation, Fermions, Bosons, Ground state, Atomic spectroscopy, Sweden.

The Green's function method used in the field theoretic approach to the many-body problem is applied to the helium atom in order to gain some insight into the connection between this approach and the usual configuration space approach. The perturbation expansion for the single-particle Green's function is obtained and shown to cor espond in first order to the Hartree-Fock equations with one of the electrons fixed in the hydrogenic 1s state. This 'quasi-particle model' was then solved to obtain the energies for the 1s2s3S, and the ground state of helium-like ions by a 1/Z expansion method. The diagram technique is used in connection with the Green's function equation of motion for both the triplet and singlet states which behave like fermion and boson systems, respectively. The singlet state requires special treatment because the ground state is normalized differently than the excited states which must be taken into account. (Author)
AD-653 562 Not available from CFSTI.

OPEN AND CLOSED SHELL STATES IN FEW-PARTICLE QUANTUM MECHANICS,
Uppsala Univ (Sweden) Quantum Chemistry Group
Werner Kutzelnigg, and Vedene H. Smith, Jr. 1 Mar 67, 54p Rept no. Scientific-22
Contract AF 61 (052)-874
Prepared in cooperation with Gottingen Univ. (West Germany). Theoretical Chemistry Group.
Availability Published in Quantum Chemistry Group for Research in Atomic, Molecular and Solid-State Theory, Uppsala Univ. (Sweden) 54p nd Preprint-183.

Descriptors: (*Atomic orbitals, *Quantum mechanics), Chemical bonds, Perturbation theory, Correlation techniques, Electrons, Atomic energy levels, Wave functions, Invariance, Sweden, West Germany.

The distinction between open and closed shell states is quite important in few-particle quantum mechanics - especially in view of the correlation problem. The current definitions of such states and of shells in general are, however, only meaningful if one can assume that the independent particle model is a valid description of the state under consideration. Definitions are given here in terms of rigorous quantum mechanical concepts which allow a classification of states irrespective of any model assumptions. Closed shell states and different types of open shell states are distinguished. Sufficient criteria for a state to be a closed shell state are derived in terms of unitary invariants of the one-particle density matrix of this state. For atomic states a classification not requiring actual quantum mechanical calculation - is possible in the framework of the Z-dependent perturbation theory by use of a theorem for the stability of a closed shell state with respect to small perturbations. Such a stability does not hold for open shell states and the transition from open to closed shell states by a perturbation is closely related to chemical binding. (Author)
AD-653 567 Not available from CFSTI.

APPROXIMATION BY A SINGLE SLATER DETERMINANT,
Uppsala Univ (Sweden) Quantum Chemistry Group
Vedene H. Smith, Jr., and Werner Kutzelnigg. 1 Mar 67, 18p Rept no. Scientific-23
Contract AF 61 (052)-874
Availability: Published in Quantum Chemistry Group for Research in Atomic, Molecular and Solid-State Theory 18p-Preprint-184 n.d.

Descriptors: (*Atomic orbitals, Determinants), (*Fermions, Wave functions), Molecular orbitals, Electrons, Nuclear spins, Matrix algebra, Perturbation theory, Hartree-Fock approximation, Sweden.
Identifiers: Slater determinants.

The single Slater determinant Phi (1,2,..., n) of n one-particle functions (spin orbitals) whose projection on a given antisymmetric n-particle wavefunction Omega (1,2,..., n) is a maximum, is shown in general not to be the same as that constructed from the first n eigenfunctions (natural spin orbitals) of a one-particle density matrix. Instead, they are the first n eigenfunctions of a transition density matrix. Some properties of these best overlap (Brueckner or exact self-consistent field) spin orbitals are discussed including their perturbation expansion. When this determinant is non-degenerate, the spin orbitals agree to first-order with Hartree-Fock spin orbitals without restriction and with the natural spin orbitals to second order (up to a possible transformation). (Author)
AD-653 570 Not available from CFSTI.

NATURAL SPIN ORBITALS FOR SOME LITHIUM WAVEFUNCTIONS CONTAINING EXPLICITLY INTERELECTRONIC COORDINATES,
Uppsala Univ (Sweden) Quantum Chemistry Group
Vedene H. Smith, Jr., and Sven Larsson. 31 Jan 67, 29p Rept no. Scientific-25
Contract F 61 (052)-874
Availability: Published in Quantum Chemistry Group for Research in Atomic, Molecular and Solid State Theory 29p Preprint-186 n.d.

Descriptors: (*Atomic orbitals, Lithium), (*Lithium, *Wave functions), Electrons, Nuclear spins, Hyperfine structure, Hartree-Fock approximation, Ground state, Sweden.

Natu al spin-orbitals (NSO) are obtained by diagonalization of the one-particle (reduced) density matrices of a number of Hylleraas-type Wavefunctions for the 2S ground state of the Lithium atom. These NSO are not doubly-degenerate as those for Helium and indicate that the unpaired spin has polarized the core. The calculation of the Fermi contact term in magnetic hyperfine structure is discussed on the basis of these data. The major contribution comes from the first three NSO and indicates the reason for the success of the unrestricted Hartree-Fock (UHF) scheme in this prob- em. (Author)
AD-653 574 Not available from CFSTI.

RESEARCH ON SOLUTIONS OF THE GRAVITATIONAL FIELD EQUATIONS.
Final technical rept.,
Pittsburgh Univ Pa
Ezra T. Newman, and Allen I. Janis. Mar 67, 144p
ARL-67-0053
Contract AF 33 (615)-1523

Descriptors: (*Relativity theory, Gravity), (*Nuclear radiation, Partial differential equations), Mass-energy relation, Scattering, Asymptotic series, Differential geometry, Spin, Special func-

tions (Mathematical), Theorems, Propagation, Interactions, Electromagnetic fields, Groups (Mathematics), Rotation, Elementary particles.

The work is primarily concerned with gravitational radiation problems and related phenomena. The work can be broadly classified into two main categories with several subclasses; (I) Exact solutions of the Ein tein field equations and thei properties, (II) Asymptotic behavior of solutions, (a) Asymptotic structure, e.g. multipole moments, (b) Scattering of gravitational radiation, (c) Asymptotic symmetries, i.e. the Bondi-Metzner-Sachs group, (d) Conservation Laws, and in particular those recently discovered by Newman and Penrose.
AD-653 581 HC$3.00 MF$0.65

APPLICATION OF METHODS COMMON TO ELEMENTARY PARTICLE PHYSICS AND MANY-BODY PROBLEMS.
Rio Grande Do Sul Univ Porto Alegre (Brazil). Instituto de Fisica
For primary bibliographic entry see Field 20H.
AD-653 624 HC$3.00 MF$0.65

INTERBAND MAGNETOOPTICAL STUDIES OF SEMICONDUCTORS AND SEMIMETALS,
Massachusetts Inst of Tech Lexington Lincoln Lab
Benjamin Lax, and John G. Mavroides. 21 Dec 66, 14p Rept no. JA-2890
ESD-TR-67-257
Contract AF 19 (628)-5167
Availability: Published in Applied Optics v6 n4 p647-59 Apr 1967.

Descriptors: (*Magneto-optic effect, Band theory of solids), Semiconductors, Optical properties, Magnetic fields, Photons, Lasers, Graphite, Antimony, Mercury compounds, Metalloids, Metalloid alloys.

The basic concepts of interband magnetooptical phenomena, involving linear single photon absorption and dispersion, are reviewed with particular emphasis on the more recent work in semiconductors and also semimetals. Experiments using laser sources in linear as well as nonlinear magnetooptical studies are discussed. (Author)
AD-653 672 Not available from CFSTI.

ALGEBRAIC ASPECTS OF REGGE RECURRENCES,
Tel-Aviv Univ (Israel)
Errol Gotsman, and Yuval Ne'eman. 13 Dec 65, 5p
AFOSR-67-1319
Grant AF-EOAR-66-39
Availability: Published in Journal of Mathematical Physics v7 n12 p2174-7 Dec 1966.

Descriptors: (*Regge poles, *Algebras), (*Elementary particles, Interactions), Groups (Mathematics), Mathematical models, Electrostatics, Decay schemes, Wave functions, Nuclear energy levels, Israel.
Identifiers: Hadrons, Spectrum generating algebras, Symmetry (Quantum mechanics).

The algebraic structure of Regge recurrences is examined, and its relation to symmetry schemes underlying various models is established. The relationship between the Spectrum Generating Algebras (SGA) and the noncompact subalgebras of the rotational states are discussed for the Coulomb potential, the three-dimensional oscillator, the signature which appears in exchange potentials, as well as the U (6,6) and the other suggested SGA of hadron physics. (Author)
AD-653 684 Not available from CFSTI.

CHARACTERIZATION OF d ELECTRONS IN SOLIDS BY STRUCTURE. II. SPONTANEOUS CRYSTALLOGRAPHIC DISTORTIONS,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20B.
AD-653 691 Not available from CFSTI.

CURRENT ALGEBRAS AND THE DECAY 'OMEGA MESON TO PION (+) PION (-) GAMMA',
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
For primary bibliographic entry see Field 20H.
AD-653 707 Not available from CFSTI.

THRESHOLD BEHAVIOUR OF 3-BODY PARTIAL-WAVE AMPLITUDES-II,
Princeton Univ N J Palmer Physical Lab
I. G. Halliday. 5 Sep 66, 17p
AFOSR-67-1363
Contract AF 49 (638)-1545
Availability: Published in Il Nuovo Cimento v48 Ser10 p982-96 Apr 21 1967.

Descriptors: (*Decay schemes, Potential theory), Elementary particles, Interactions, Groups (Mathematics), Integrals, Wave functions.

The threshold behaviour of 3-body production processes is examined in potential theory. Use is made of a decomposition into states with total angular momentum J and component M along a body-fixed axis. All possible limits for the momenta pi of the final-state particles going to zero are treated in detail. Due to an unnoticed identity the results of a previous paper are altered (See Nuovo Cimento v42B p38 1966). The nonleading terms are also treated.
AD-653 802 Not available from CFSTI.

Kl3 FORM FACTORS ANH THE PION CHARGE FORM FACTOR,
Harvard Univ Cambridge Mass Dept of Physics
H. T. Nieh. 4 Apr 66, 6p
AFOSR-67-1372
Contract AF 49 (638)-1380
Availability: Published in The Physical Review v148 n4 p1344-7 Aug 26 1966.

Descriptors: (*Decay schemes, Field theory), (*K mesons, Decay schemes), (*Pions, Electrostatics), Meson reactions, Momentum, Mathematical models, Vector analysis, Groups (Mathematics).
Identifiers: Lagrangian field theory.

Phenomenological Lagrangian models for Kl3 decays and the pion charge form factor are introduced by assuming single-particle dominance and the trilinear meson interactions derived by Schwinger from his composite model for mesons. The usual pole models in the dispersion approach assume that the structure of a 'particle' is entirely due to emission and absorption of another particle or particles by a point-like source. The proposed models differ from these allowing the structure of the source to be included. In other words, all q sq. dependences of the form factors are kept where they are. For small momentum transfers, the form factors can be effectively put into the standard form 1/ (1+ (q sq.)/ (m sq.)) with m an effective mass parameter. Assuming K* dominance the effective-mass parameters in the Kl3 form factors f plus or minus (q sq.) to be about 700 MeV. By assuming neutral-RHO dominance, the effective-mass parameter for the pion charge form factor, f pi (q sq.) is predicted to be about 600 MeV. (Author)
AD-653 807 Not available from CFSTI.

ON THE METHOD OF DASHEN AND GELL-MANN,
Harvard Univ Cambridge Mass Lyman Lab of Physics
Signey Coleman. 6 Sep 65, 5p
AFOSR-67-1381
Contract AF 49 (638)-1380
Prepared in cooperation with CERN, Geneva (Switzerland).
Availability: Published in Physics Letters v19 n2 p144-5 Oct 1 1965.

Descriptors: (*Elementary particles, Groups (Mathematics)), Invariance, Momentum, Hamiltonian, Integrals, Vector analysis, Switzerland.
Identifiers: Symmetry (Quantum mechanics).

Dashen and Gell-Mann have proposed (Phys. Letters v17 p142, 145 1965) an ingenious method for obtaining many of the desirable consequences of SU (6) invariance while avoiding the notorious difficulties of a fully relativistic SU (6) invariant theory. They assume that a group called the hybrid collinear group turns one-particle states with the appropriate direction of motion into one-particle states. They phrase this by saying that the other elements of the original group 'leak' while the elements of the collinear group do not. The purpose of this note is to prove that if the hybrid collinear group does not leak, it commutes with the Hamiltonian. Thus the Dashen-Gell-Mann theory contains an internal contradiction. The argument is stable, in the sense that the contradiction persists if small leakage is allowed.
AD-653 809 Not available from CFSTI.

CAN THE SQUARE OF THE ISOTOPIC SPIN BE CONSERVED BUT NOT THE TOTAL ISOTOPIC SPIN,
California Univ Berkeley Dept of Physics
Sidney Coleman. 24 Jan 66, 3p
AFOSR-67-1380
Contract AF 49 (638)-1380
Availability: Published in Physical Review Letters v16 n12 p539-40 Mar 21 1966.

Descriptors: (*Nuclear spins, Invariance), Elementary particles, Interactions, Operators (Mathematics), Relativity theory, Field theory.

It is usually believed that the strong interactions conserve all three components of isotopic spin. However Vander Velde has suggested Phys. Rev. Letters v16 p69 1966 that they may, in fact, conserve only Iz and Isq. In a nonrelativistic limit, it is easy to construct models which have this property (e.g., particles interacting through a potential which is polynomial in Iz). The purpose of this note is to show that in relativistic local field theory it is impossible to fulfill Vander Velde's speculation; if Isq. is conserved, total isotopic spin I is also.
AD-653 810 Not available from CFSTI.

EXTRAPOLATION PROBLEM IN CURRENT ALGEBRA CALCULATIONS OF THE PION-PION SCATTERING LENGTHS,
Maryland Univ College Park Dept of Physics and Astronomy
For primary bibliographic entry see Field 20H.
AD-653 817 Not available from CFSTI.

REPRESENTATION MIXING IN U12,
Imperial Coll of Science and Technology London (England) Dept of Physics
O. Nwachuku, P. Mahanta, and D. Akyeampong. 13 Jun 66, 7p
AFOSR-67-1365
Grant AF-EOAR-46-64
Prepared in cooperation with the International Centre for Theoretical Physics, Trieste (Italy).
Availability: Published in Nuovo Cimento Ser10 v47 p730-4 Feb 21 1967.

Descriptors: (*Elementary particles, Groups (Mathematics)), (*Baryons, Groups (Mathematics)), Interactions, Wave functions, Vector analysis, Magnetic moments, Great Britain.
Identifiers: Symmetry (Quantum mechanics).

Some consequences of the assumption that the physical baryons belong to some mixed represen-

tations of U6,6 are studied in the context of the 3-point, electromagnetic and weak vertices and the 4-point Johnson-Treiman relations. (Author)
AD-653 821 Not available from CFSTI.

FOUNDATIONS RESEARCH IN PHYSICS,
Syracuse Univ N Y Dept of Physics
Peter G. Bergmann. 1967, 17p
AFOSR-67-1373
Grant AF-AFOSR-789-66
Research supported in part by ARL.
Availability: Published in Delaware Seminar in the Foundations of Physics p1-14 New York Springer-Verlag 1967.

Descriptors: (*Physics, Philosophy), Scientific research, History, Symposia.

The foundations of physical theories are discussed. The role of philosophy in physics is touched on. The role of epistomology and logical analysis in physical theory is examined in some depth. (Author)
AD-653 828 Not available from CFSTI.

THE GENERAL SPACE-MOMENTUM COMMUTATION RELATION.
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
For primary bibliographic entry see Field 12A.
AD-653 836 HC$3.00 MF$0.65

ELECTROMAGNETIC MASSES OF PSEUDOSCALAR MESONS.
Revised ed.,
Harvard Univ Cambridge Mass Dept of Physics
H. T. Nieh. 7 Mar 66, 5p
AFOSR-67-1408
Contract AF 49 (638)-1380
Revision of manuscript received 14 Jan 66.
Availability: Published in Physical Review v146 n4 p1020-2 Jun 24 1966.

Descriptors: (*Mesons, Electromagnetic properties), Baryons, K mesons, Groups (Mathematics), Special functions (Mathematical), Mathematical models.
Identifiers: Mass, Vacuons.

Based on a recently proposed generalization of the 'tadpole' model of Colemand and Glashow, the six electromagnetic mass splittings of baryons and pseudoscalar mesons are considered. With the inclusion of the nontadpole contributions by Coleman and Schnitzer and by Socolow, the agreement between theory and experiment is satisfactory. (Author)
AD-653 906 Not available from CFSTI.

CURRENT ALGEBRAS IN A PERTURBATION-THEORETIC MODEL,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
B. Hamprecht. 22 Jul 66, 18p
AFOSR-67-1349
Grant AF-EOAR-36-65
Availability: Published in Il Nuove Cimento v47 ser10 p770-85 Feb 21 1967.

Descriptors: (*Elementary particles, *Perturbation theory), Mathematical models, Algebras, Mesons, Matrix algebra, Diagrams, Integrals, Great Britain.
Identifiers: Current algebras, Feynman diagrams, Quarks.

The model of Johnson and Low is extended to all orders in perturbation theory. It is shown that additional terms in the commutator of two currents can only arise from integrals connected with divergent Feynman diagrams. Furthermore, the appearance of these additional terms depends on the details of the cut-off prescription. It is concluded that the model is compatible with certain additional terms but cannot be said to predict their presence because of a lack of understanding of the details of the renormalization procedure. (Author)
AD-653 908 Not available from CFSTI.

NONSIMPLE PHYSICAL-REGION SINGULARITIES OF THE S-MATRIX,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
J. K. Storrow. 6 Jun 66, 26p
AFOSR-67-1350
Grant AF-EOAR-79-63
Availability: Published in Il Nuovo Cimento v48 ser10 p593-616 Apr 1 1967.

Descriptors: (*Elementary particles, *S-matrix), Diagrams, Decay schemes, Interactions, Equations, Perturbation theory, Great Britain.
Identifiers: Singularity.

A certain class of nonsimple s ngularities is analysed by S-matrix methods. A nonsimple singularity is one whose Landau-Cutkosky diagram does not consist of a network of single lines. The positive-alpha condition and the Cutkosky formula are deduced, in agreement with perturbation theory. (Author)
AD-653 909 Not available from CFSTI.

A POSSIBLE STRUCTURE FOR C-VIOLATING ELECTROMAGNETIC INTERACTIONS,
Boston Univ Mass Dept of Physics
P. Roman, and S. K. Yun. 1 Sep 66, 14p
AFOSR-67-1357
Grant AF-AFOSR-385-65
Availability: Published in Il Nuovo Cimento v48 Ser10 p454-65 Mar 21 1967.

Descriptors: (*Decay schemes, Invariance), (*Mesons, Decay schemes), (*Baryons, Decay schemes), Elementary particles, Electrostatics, Ham ltonian, Transformations (Mathematics), Meson reactions, Nuclear resonance, Nuclear spins.
Identifiers: C-invariance, Hadrons, Omega mesons, Phi mesons, Symmetry (Quantum mechanics).

In accord with Lee's ideas on discrete space-time symmetries, a phenomenological electromagnetic Hamiltonian H-gamma is suggested for hadrons, which contains even-C and odd-C SU3 tensor components. The simplest consequences of this interaction are explored. It appears that in many instances the C-violating part does not become effective. Further significant tests of the theory are predicted for certain C-violating meson and decuplet baryon electromagnetic decays. Some comments on the possible underlying dynamics are also made. (Author)
AD-653 919 Not available from CFSTI.

EARTH EXPANSION; GENERAL RELATIVITY; PROBLEMS OF ABSTRACT ALGEBRA.
Hamburg Univ (Germany)
For primary bibliographic entry see Field 8G.
AD-653 981 HC$3.00 MF$0.65

SOME REMARKS ABOUT SPINWAVES AND ZERO SOUND IN LOW TEMPERATURE LIQUID He (3),
Brandeis Univ Waltham Mass Dept of Physics
Gottfried T. Schappert. May 67, 12p Rept no. Scientific-6
AFCRL-67-0323
Contract AF 19 (628)-5833

Descriptors: (*Helium, Dispersion relations), Propagation, Cryogenics, Acoustic properties, Nuclear spins, Liquefied gases.

The dispersion relations for zero sound and spin waves in low temperature Landau Fermi liquids are analyzed. It is pointed out that besides the well-known condition for the propagation of m = 1 modes F sub l > 6 or G sub l > 6, the m = 0 modes require F sub l > -F sub 0/ (l + 1/3 F sub 0) or G sub 0 > -G sub 0/ (l + 1/3 G sub 0). (Author)
AD-654 015 HC$3.00 MF$0.65

THE INTERNATIONAL CENTRE FOR THEORETICAL PHYSICS ANNUAL REPORT, 1965-1966.
International Centre for Theoretical Physics, Trieste (Italy).
Dec 66, 24p

Descriptors: *Research facility, *Theoretical physics, *Training, Activity, Development, Elementary, Facility, Italy, Particle, Physics, Plasma, Report, Research, Theoretical.

For abstract, see STAR 05 15.
N67-27922 HC$3.00 MF$0.65

RESEARCH RELATED TO AN EXPERIMENTAL TEST OF GENERAL RELATIVITY SEMIANNUAL STATUS REPORT, 1 JUL. - 31 DEC. 1966.
Illinois Univ., Urbana. Coordinated Science Lab.
For primary bibliographic entry see Field 22A.
For abstract, see STAR 05 15.
N67-28003 HC$3.00 MF$0.65

INTRODUCTION TO RADIATION PHYSICS. CHAPTER V - MODERN PHYSICS AND ATOMIC STRUCTURE.
Introduzione Alla Fisica Delle Radiazioni. Capitolo V - La Fisica Moderna E La Struttura Atomica
Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
U. Amaldi, Jr. 10 Jan 67, 77p ISS-67/1
in Italian, English Summary

Descriptors: *Quantum mechanics, *Relativity, Atom, Classical, Corpuscular, Mechanics, Physics, Quantum, Radiation, Stability, Structure, Wave.

For abstract, see STAR 05 15.
N67-28845 HC$3.00 MF$0.65

RESEARCH ON NON-EQUILIBRIUM STATISTICAL PHYSICS FINAL REPORT.
Brussels Univ. (Belgium).
I. Prigogine. 31 Oct 66, 31p AFOSR-67-0927, AD-651069
Contract AF-EOAR-64-52

Descriptors: *Kinetic theory, *Statistical mechanics, Cerenkov radiation, Equation, Field, Gravitational, Kinetic, Magnetic, Mechanics, Nonequilibrium, Physics, Radiation, System, Theory, Thermodynamics, Transformation.

For abstract, see STAR 05 15.
N67-28942 HC$3.00 MF$0.65

20K. SOLID MECHANICS

CONCENTRATED FORCE IN EIGHTH-SPACE WITH MIXED BOUNDARY CONDITIONS,
American Univ Beirut (Lebanon)
Wasfi A. H rab. 15 Jul 65, 14p
AFOSR-67-1303
Grant AF-EOAR-112-63
Availability: Published in Journal fuer die Reine und Agnewandte Mathematik v225 p85-96 1967.

Descriptors: (*Force (Mechanics), Boundary value problems), Green's function, Mathematical analysis, Stresses.
Identifiers: Papkovitch functions.

The solution of the three-dimensional problem of a concentrated force at an interior point in eighth-

space (corner bounded by three mutually perpendicular planes) with mixed boundary conditions, zero in-plane displacements and zero normal stress on each of the three boundary planes, is given. The solution expresses the boundary conditions in terms of Papkovitch functions and uses Green's analysis to evaluate these functions. The corresponding problems of the quarter-space and the half-space are special cases of the solution given. (Author)
AD-653 439 Not available from CFSTI.

STRESS-RELIEF EMBRITTLEMENT OF AX-140 AND E-11018 WELD METALS,
Navy Marine Engineering Lab Annapolis Md
For primary bibliographic entry see Field 13H.
AD-653 454 HC$3.00 MF$0.65

SECOND-ORDER ELONGATION OF METAL TUBES IN CYCLIC TORSION.
Technical rept.,
Columbia Univ New York Inst for the Study of Fatigue and Reliability
Maria Ronay. May 67, 24p Rept no. TR-49
Contract Nonr-266 (91)

Descriptors: (*Aluminum, Stresses), Pipes, Thickness, Torsion, Tensile properties, Strain (Mechanics), Creep.

Aluminum tubes of different wall-thickness are subjected to reversed cyclic torsion of the same amplitude superimposed on the same axial tensile stress. The observed strong dependence on wall thickness of the axial extension accumulating with the number of torsion cycles ('cyclic creep') implies that this phenomenon is due to the amplification, by superimposed tension, of accumulating second-order strain increments. (Author)
AD-653 469 HC$3.00 MF$0.65

THE SURFACE EFFECTS DUE TO BODY FORCES IN THE INTERIOR OF AN ELASTIC HALF-SPACE,
Duke Univ Durham N C Dept of Mathematics
Ian N. Sneddon. 1966, 19p
AFOSR-67-1287
Grants AF-AFOSR-61-51, AF-AFOSR-62-162
Prepared in cooperation with Glasgow Univ. (Scotland). Dept. of Mathematics.
Availability: Published in Arch Mech Stos v3 n18 p403-21 1966.

Descriptors: (*Force (Mechanics), *Elasticity), (*Stresses, Surface properties), Distribution, Strain (Mechanics), Integral transforms, Surfaces.
Identifiers: Elastic half-space.

The paper considers the problem of determining (within the framework of the classical theory of elasticity) the distribution of stress of the boundary plane z = O of the elastic half-space z > or = O when there is a prescribed distribution of body forces acting in the interior of the elastic body. Two cases are considered separately: (a) the boundary is assumed to be free of applied stress; (b) the boundary is kept fixed. The method employed is the three-dimens onal analogue of a method used earlier to solve the corresponding plane strain problem. Since most interest is focussed on the surface stress distribution, or the surface displacement, the Laplace transform is used to calculate it without the distribution of stress in the interior of the sol having to be calculated first. Finally, the case of plane strain is deduced as a special case. (Author)
AD-653 495 Not available from CFSTI.

DEFORMATION PROCESSING OF STAINLESS STEEL.
Battelle Memorial Inst Columbus Ohio
For primary bibliographic entry see Field 13H.
AD-653 577 HC$3.00 MF$0.65

NONDESTRUCTIVE EVALUATION OF METAL FATIGUE.
Scientific rept. for 1966-1967,
Southwest Research Inst San Antonio Tex Dept of Instrumentation Research
Felix N. Kusenberger, Byron E. Leonard, John R. Barton, and W. Lyle Donaldson. Apr 67, 92p
Rept no. SwRI-15-1688-2
AFOSR-67-1288
Contract AF 49 (638)-1502

Descriptors: (*Metals, *Fatigue (Mechanics)), Non-destructive testing, Vacuum apparatus, Design, Atmosphere, Damage, Photographs, Instrumentation, Steel, Photomicrography, Ultrasonic properties, Rayleigh waves, Aluminum, Measurement, Stresses, Magnetic properties, Cracks, Tests, Laboratories.

The purposes of this program were threefold: to design and fabricate a vacuum chamber such that specimens can be stress cycled and nondestructively monitored while in a controlled atmosphere; to develop electric current equipment for nondestructive evaluation of fatigue in nonferromagnetic metals under controlled atmosphere; and to modify existing ultrasonic and magnetic perturbation equipments such that nondestructive evaluations can be conducted in a controlled atmosphere using these techniques; to stress cycle specimens and conduct nondestructive evaluations of fatigue damage in these specimens. Photographs of the fatigue damage evaluation facility are shown including the vacuum chamber and associated equipment. Features and capabilities of the vacuum system are discussed. A description of the electric current nondestructive evaluation apparatus is given including photographs and a discussion of the technique. Modification of existing ultrasonic surface wave and magnetic perturbation equipments so that they can be used for fatigue damage evaluation in a vacuum are also described. Fatigue evaluation experiments on a steel specimen stress cycled in the laboratory ambient atmosphere are described. The results obtained utilizing the ultrasonic and magnetic nondestructive monitoring instrumentation are presented. (Author)
AD-653 587 HC$3.00 MF$0.65

SHEAR MODULUS DETERMINATION IN LAMINATED COMPOSITE MATERIALS.
Air Force Materials Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11D.
AD-653 590 HC$3.00 MF$0.65

INTERFEROMETRIC MEASUREMENT OF DISPLACEMENTS DURING WAVE PROPAGATION IN SOLIDS,
Ballistic Research Labs Aberdeen Proving Ground Md
J. H. Suckling, and J. T. Frasier. Apr 67, 56p
Rept no. BRL-1362

Descriptors: (*Metals, *Deformation), Elasticity, Plasticity, Interferometers, Measurement, Propagation, Solids.

A program was designed to demonstrate and evaluate the use of streak interferometry as a method for collecting temporally and spatially resolved transient deformation data on the surfaces of metallic solids. It is proposed that the technique has an important application in the establishment of constitutive relationships for solids transmitting elastic-plastic waves. The study showed that the technique can resolve displacement histories with times as short as 70 nanoseconds and measure surface velocities as large as 80 inches per second. These capabilities appear adequate for the intended applications. Representative data are shown and analyzed. (Author)
AD-653 635 HC$3.00 MF$0.65

A PATH INDEPENDENT INTEGRAL AND THE APPROXIMATE ANALYSIS OF STRAIN CONCENTRATION BY NOTCHES AND CRACKS,
Brown Univ Providence R I Div of Engineering
For primary bibliographic entry see Field 12A.
AD-653 716 HC$3.00 MF$0.65

THE DYNAMIC STRESS-STRAIN RELATION OF LEAD AND ITS DEPENDENCE ON GRAIN STRUCTURE.
Technical rept.,
Brown Univ Providence R I Div of Engineering
J. M. Gondusky, and J. Duffy. May 67, 41p Rept no. TR-53
Contract Nonr-572 (20)

Descriptors: (*Stresses, *Lead), (*Strain (Mechanics), Lead), Dynamics, Compressive properties, Physical properties, Grain size, Mathematical analysis, Crystal structure, Tables, Grain structures (Metallurgy), Measurement, Calibration, Samplers, Preparation, Captive tests.

Several specimens of commercial and high-purity lead of various grain size and crystallographic orientation were loaded dynamically in compression by means of the split Hopkinson bar. Strain rate was held constant at approximately 1200/sec for strains up to about 15%. The dynamic stress-strain curves were found to lie approximately 50% higher than the corresponding static curves. The compression tests described formed part of a larger project whose purpose was to determine dynamic values of Tabor's constant for lead and its dependence on crystal orientation. For this purpose the results of the compression tests were combined with those of dynamic indentation tests previously performed on the same lead specimens. It was found that dynamic values of Tabor's constant range from 2.4 to 6.0 depending upon grain size and orientation. These values are approximately equal to the corresponding static values. They may be compared to the value of 2.8 obtained by Tabor and other investigators for numerous fine-grained polycrystalline materials, including lead, and for strains up to about 20%. (Author)
AD-653 718 HC$3.00 MF$0.65

STRAINS AND STRESSES IN MATRICES WITH INSERTS,
A. J. /Durelli ;V. J. /Parks ;H. C. /Feng ;F. /Chiang
Catholic Univ of America Washington D C School of Engineering and Architecture
May 67, 134p Rept no. 12
Contract Nonr-2249 (06)

Descriptors: (*Composite materials, *Stresses), Models (Simulations), Photoelasticity, Analysis, Strain (Mechanics), Interfaces, Reinforced concrete, Reinforced plastics, Whiskers (Crystals), Tires, Elasticity.

This paper is a contribution to the experimental stress analysis of composite structures made of a matrix reinforced with fibers. The analysis is conducted in oversize transparent models in which the matrix is cast around inserts of different rigidities. The manufacturing of the models is described. Two- and three-dimensional photoelasticity are used for the analysis. Stresses and strains along the interfaces, and near the fiber ends, for different fiber end configurations, are studied in detail. Bonded and unbonded interfaces are analyzed. Two loading conditions are considered: restrained shrinkage and mechanically applied loading. Several of the difficulties encountered in the analysis are pointed out. The method developed will have application in the fields of fiber reinforced plastic structures, whisker reinforced metals, auto tires, ceramics and reinforced concrete, among others. (Author)
AD-653 721 HC$3.00 MF$0.65

THE RESPONSE OF A THIN ELASTIC PLATE TO A MOVING PRESSURE POINT,

Adelphi Univ Garden City Ny
Robert G. Payton. 30 Jun 66, 15p
AFOSR-67-1334
Grant AF-AFOSR-821-65
Availability: Published in Journal of Applied Mathematics and Physics v18 n1 p1-12 1967.

Descriptors: (*Structural parts, Loading (Mechanics)), Elasticity, Motion, Pressure, Response, Deflection.
Identifiers: Plates (Mechanical).

A thin elastic plate, infinite in extent, is suddenly subjected to a pressure point load which thereafter moves in a straight line with constant speed c. Using elementary plate theory, an integral representation of the plate deflection is found. This integral can be evaluated in certain special cases, in particular at the origin and under the moving load. Asymptotic results indicate that large plate deflections can be expected along the track of the load. Finally, the steadily moving point loading solution of a plate is found as a limiting result of the general transient problem. (Author)
AD-653 731 Not available from CFSTI.

A NOTE ON GRIFFITH CRACKS,
Duke Univ Durham N C Dept of Mathematics
Morton Lowengrub. 4 Apr 66, 5p
AFOSR-67-1378
Grant AF-AFOSR-435-63
Prepared in cooperation with Wesleyan Univ., Middletown, Conn.
Availability: Published in Proceedings of the Edinburgh Mathematical Society v15 Ser2 pt2 p131-4 Dec 1966.

Descriptors: (*Cracks, Stresses), Elasticity, Integral equations, Integral transforms, Boundary value problems.

The problem of determining the distribution of stress in the neighborhood of a two-dimensional crack which is subject to an internal pressure varying along the length of the crack has been considered by various authors. In the present note expressions are derived for the stress intensity factor and the energy required to open up the crack, in terms of a general pressure distribution. This is done by solving certain dual integral equations that arise when the boundary-value problem is treated by Fourier sine and cosine transforms. (Author)
AD-653 826 Not available from CFSTI.

FORCED VIBRATIONS OF SUBMERGED SPHEROIDAL SHELLS,
Columbia Univ New York Dept of Civil Engineering and Engineering Mechanics
Thimothy Yen, and Frank DiMaggio. 1967, 10p
Research supported in part by ONR.
Availability: Published in Journal of the Acoustical Society of America v41 n3 p618-26 Mar 1967.

Descriptors: (*Structural shells, *Vibration), Spheres, Underwater, Numerical methods and procedures, Analytic functions, Aluminum, Deflection, Pressure.

The extensional displacements of prolate spheroidal shells and the pressure field in the surrounding fluid are obtained as a function of the driving frequency of an axisymmetric, distributed, harmonic load applied to the surface of the shell. By appropriate transformations of response functions and a geometric variable, the problem is reduced to the simultaneous numerical integration of equations on analytic functions in a finite domain. Numerical results are presented for an aluminum shell of moderately large eccentricity submerged in water. (Author)
AD-653 870 Not available from CFSTI.

DYNAMIC SNAP-THROUGH OF A SIMPLE VISCOELASTIC TRUSS,
California Univ San Diego La Jolla
W. Nachbar, and N. C. Huang. 3 Aug 66, 21p
AROD-5133:47
Contract DA-31-124-ARO (D)-257, ARPA Order-0570
Availability: Published in Quarterly of Applied Mathematics v25 n1 p65-82 Apr 1967.

Descriptors: (*Structural parts, Buckling (Mechanics)), Dynamics, Viscoelasticity, Numerical analysis, Loading (Mechanics).

In order to understand the behavior of shallow structures in dynamic snap-through or buckling, a detailed study was made for a plane, viscoelastic, three-hinged truss with a concentrated mass at the central hinge, and with a normal load of constant magnitude applied suddenly at this hinge. The dynamic buckling criterion is found to correspond to values of the parameters for which the solution goes into the saddle point of a two-dimensional autonomous system. It is shown that another dynamic buckling criterion, based upon the asymptotic behavior of solutions in time, can give incorrect results in certain cases. Two methods to compute buckling loads are investigated with the aid of a phase plane diagram and potential curves. Approximations to the buckling load, including an upper bound, are computed by means of an energy integral method. The exact buckling loads are computed by numerical integration of the governing differential equation. (Author)
AD-653 890 Not available from CFSTI.

APPLICATION OF MICROFRACTOGRAPHY TO THE STUDY OF CRACK PROPAGATION UNDER FATIGUE STRESSES,
Advisory Group for Aerospace Research and Development Paris (France)
Gerhard Jacoby. 1966, 202p Rept no. AGARD-541
NATO Furnished.

Descriptors: (*Fractography, *Crack propagation), Stresses, Fatigue (Mechanics), Fracture (Mechanics), Aluminum alloys.

Starting from a variety of observations and hypotheses concerning crack propagation, the possibilities of any macro- and principally micro-fractography to that stage of the fatigue process has been described. Microfractography - the examination of a fracture surface under high and ultra-high magnification by means of an optical or an electron-microscope - makes it possible to study the mechanism of crack propagation under fatigue stresses in relation to external and internal parameters which are otherwise difficult or impossible to observe. Microfractography appears to be particularly suitable for the study of cumulative damage and for the determination of the cause of service failures. (Author)
AD-653 918 HC$3.00 MF$0.65

INVESTIGATION OF HEAT TRANSFER AND SUCTION AS A MEANS FOR TRIPPING THE BOUNDARY LAYER.
Douglas Aircraft Co Inc Long Beach Calif Aircraft Div
For primary bibliographic entry see Field 20D.
AD-653 980 HC$3.00 MF$0.65

TEMPERATURE DEPENDENCE OF THE ELASTIC CONSTANTS OF RUBIDIUM,
John Carroll Univ Cleveland Ohio
E. J. Gutman, and J. Trivisonno. 17 Oct 66, 8p
AFOSR-67-1368
Contract Nonr-2577 (01), Grant AF-AFOSR-862-65
Availability: Published in J. Phys. Chem. Solids v28 p805-9 1967.

Descriptors: (*Rubidium, *Elasticity), (*Single crystals, Rubidium), Ultrasonic properties, Temperature, Shear stresses, Modulus of elasticity, Anisotropy.

The adiabatic elastic constants of single crystal rubidium were measured as a function of temperature from 170-78K by the ultrasonic pulse echo technique. In order to eliminate the transit time errors and facilitate handling of the samples a buffer technique was employed. The measured elastic constants at 78K (in units of 10 to the 10th power dyn (sq. cm)) are as follows: C = 1.98, C' = 0.256, Cn = 4.97 and Bs = 2.90. The notation C = C44, C' = (C11-C12)/2, Cn = (C11+C12+2C44)/2 and Bs = Cn-C-C'/3 is used. The shear stiffness C and C' are interpreted in terms of Fuchs' electrostatic contributions to the shear constants of the alkali metals. The constant pressure temperature dependence of the elastic constants (d ln c/dT)p is also listed. The bulk modulus obtained from the ultrasonic measurements is also compared with the isothermal compressional data of Swenson. (Author)
AD-654 019 Not available from CFSTI.

DEVELOPMENT OF STANDARD TESTS APPLICATION OF THE IMPACT AND SAND TESTS TO THE STUDY OF NITROGLYCERIN AND OTHER LIQUID EXPLOSIVES.
Picatinny Arsenal Dover N J
For primary bibliographic entry see Field 19A.
AD-654 050 HC$3.00 MF$0.65

THE USE OF SIMPLE VISCOELASTIC MODELS IN STRESS ANALYSIS,
Standard-Thomson Corp Dayton Ohio
C. R. Arnold, E. H. Lee, and J. Panarelli. 1966, 16p
AROD-1892:6
Grant DA-ARO (D)-31-124-G367
Prepared in cooperation with Brown Univ., Providence, R. I.
Availability: Published in International Congress on Rheology (4th), p287-99 n.d.

Descriptors: (*Viscoelasticity, *Stresses), Mathematical models, Mathematical analysis, Fourier analysis, Series, Polymers, Relaxation time.

While it is known that most polymeric materials exhibit a broad spectrum of relaxation or delay times, only a narrow band of response may be stimulated in a particular loading situation. For such a case, a simple viscoelastic model representation of the material response may be satisfactory for stress analysis. The model then represents the material characteristics as they influence the response to this history of loading, and a different model would in general be needed for the same material subjected to another load variation. A simple example of the use of a four-element model is discussed with suggestions on choice of the appropriate model. The application of a simple model representation can often greatly simplify stress calculations. (Author)
AD-654 094 Not available from CFSTI.

THE CONTACT PROBLEM FOR VISCOELASTIC BODIES,
Stanford Univ Calif
Wei Hsuin Yang. 10 May 65, 10p
AROD-1892:7
Grant DA-ARO (D)-31-124-G367
Prepared in cooperation with California Inst. of Tech., Pasadena.
Availability: Published in Journal of Applied Mechanics v33 p395-401 1966, Paper 65-APMW-36.

Descriptors: (*Viscoelasticity, Surfaces), Deformation, Spheres, Integrals, Materials, Interactions.

The viscoelastic contact problem is extended to cover general linear materials and arbitrary quadratic surfaces of the bodies in contact. Use of integral operator constitutive relations permits solution by comparison with a known integral identity

in potential theory, as used by Hertz in the original elastic solution. Examples are given for the case of indentation of a viscoelastic half-space by a rigid spherical indenter and the case of contact between two spheres with different material properties. (Author)
AD-654 097 Not available from CFSTI.

MEASUREMENT OF THE MECHANICAL PROPERTIES OF SOLIDS AT HIGH PRESSURE.
Revised ed.,
Yale Univ New Haven Conn Dept of Engineering and Applied Science
Robert B. Gordon, and Leslie F. Mike. 15 Dec 66, 9p
AROD-4894:3
Contract DA-31-124-ARO (D)-244
Revision of manuscript submitted 1 Nov 66.
Availability: Published in The Review of Scientific Instruments v38 n4 p541-6 Apr 1967.

Descriptors: (*Mechanical properties, Measurement), (*High-pressure research, Mechanical properties), (*Test equipment, Mechanical properties), Stresses, Strain (Mechanics), Deformation, Force (Mechanics), Strain gages, Compressive properties, Creep, Hardness, Internal friction, Solids.

Apparatus for making precision measurements of the stress-strain curves of solids under high pressure has been developed. Constant deformation rate is obtained by use of an electric motor drive system operating within the pressure vessel. Forces are measured with a resistance strain gauge load cell also within the vessel. The equipment may be adapted for making compression or tension tests, stress relaxation and creep experiments, microhardness measurements, and observations of internal friction in solids under true hydrostatic pressure. (Author)
AD-654 099 Not available from CFSTI.

DYNAMIC FLEXURAL BUCKLING OF RODS WITHIN AN AXIAL PLASTIC COMPRESSION WAVE,
Stanford Research Inst Menlo Park Calif Poulter Labs
G. R. Abrahamson, and J. N. Goodier. 7 Apr 65, 10p
Contract AF 29 (601)-6360
Presented at the Western Conference of the Applied Mechanics Div., of the American Society of Mechanical Engineers, Los Angeles, Calif., 30 Aug-1 Sep 65.
Availability: Published in Journal of Applied Mechanics p241-7 Jun 1966. Paper 65-APMW-32.

Descriptors: (*Rods, *Buckling (Mechanics)), Equations of motion, Mechanical waves, Aluminum alloys, Impact tests, Strain (Mechanics).

Rods impacting a rigid target at velocities sufficient to produce several percent axial strain are found to buckle plastically with a fairly reproducible wavelength. This phenomenon is investigated for materials which exhibit strain-hardening, a property which is crucial to the theory. The buckling motion is treated as a perturbation of the motion associated with the axial compression. It is assumed that the axial strain rate dominates the extensional strain rate due to bending, so that no strain-rate reversal occurs until after the buckling is well developed. Elastic deformations are neglected, and the material is taken to follow a linear strain-hardening law. It is found that the predicted wavelength and buckling time are in reasonable agreement with experimental results. (Author)
AD-654 110 Not available from CFSTI.

TRAVELING FORCES ON STRINGS AND MEMBRANES.
Revised ed.,
Stanford Research Inst Menlo Park Calif Poulter Labs
M. F. Kanninen, and A. L. Florence. 25 Jul 66, 14p
Contract AF 29 (601)-6360
Revision of manuscript submitted 18 Mar 66.
Availability: Published in Int. J. Solids Structures v3 p143-54 1967.

Descriptors: (*Force (Mechanics), *Cordage), (*Membranes, Force (Mechanics)), High-pressure research, Detonations, Loading (Mechanics), Aluminum, Stresses, Equations of motion, Structures, Boundary value problems, Integrals, Special functions (Mathematical), Computer programs.

The use of explosives to simulate uniformly distributed impulsive loads is investigated theoretically for two simple structures, a stretched infinite string and a stretched infinite membrane. The action of an explosive located over a string or membrane is represented by traveling forces which are approximations to the narrow high pressure regions at the detonation fronts. The resulting velocity distributions are compared with the uniform velocity distributions caused by the same total impulse uniformly distributed over the line or area traversed by the forces. Criteria for good simulation are supplied. (Author)
AD-654 111 Not available from CFSTI.

IMMERSED-FOIL METHOD FOR MEASURING SHOCK WAVE PROFILES IN SOLIDS,
Stanford Research Inst Menlo Park Calif Poulter Labs
Thomas J. Ahrens, and M. H. Ruderman. 4 May 66, 9p
Contract DA-49-146-XZ-277
Availability: Published in Journal of Applied Physics v37 n13 p4758-65 Dec 1966.

Descriptors: (*Shock waves, *Solids), Light, Reflection, Liquids, Foils, Plastics, Refractive index, Density, Attenuation, Velocity, Measurement, High-pressure research, Images, Cameras.

A new technique is described for measuring, essentially directly, a complex shock front profile that is transmitted into a transparent liquid from a solid material. The image of a grid light source, reflected from a Mylar foil immersed within the liquid, is recorded with a streak camera. Index of refraction data for liquids in the high-pressure shocked state (required for calculating particle velocities from image displacements) are reported for glycerol, ethanol, water, and hexane to 220, 135, 58, and 41 kbar, respectively. The increase of index of refraction with density for water agrees with that reported by Zel'dovich, Sinitsyn, and Kormer, but is considerably less (as are also the results for the other liquids) than that predicted by the Lorentz-Lorenz formula. Hugoniot data obtained concurrently with the refractive index data agree closely with those of Rice and Walsh. Applications of the immersed-foil method are discussed for: determining the release adiabats from shock states produced by a double shock front in a solid; the study of shock wave attenuation in solids; and measurement of the adiabatic sound velocity of liquids in the high-pressure shocked state. (Author)
AD-654 112 Not available from CFSTI.

OPTICAL PHENOMENA ASSOCIATED WITH THE SHOCK COMPRESSION OF SODIUM CHLORIDE AND POTASSIUM BROMIDE,
Stanford Research Inst Menlo Park Calif Poulter Labs
Ronald K. Linde, and Donald G. Doran. 1966, 7p
Research supported in part by ARPA.
Availability: Published in Nature v212 n5057 p27-9 Oct 1 1966.

Descriptors: (*Shock waves, *Solids), (*Crystal lattices, Shock waves), Compressive properties, Single crystals, Cracks, Density, Potassium compounds, Crystal structure, Spectrophotometers, Chlorides, Bromides, Optical phenomena, Luminescence.

The study of shock waves in solids is an active area of research, but relatively little progress has been made toward a detailed understanding of the interactions of shock waves with the crystal lattice and defect structure of solids. The paper describes the results of some exploratory experiments on colour centre transformation and luminescence. Spectrophotometry was used to study the effects of shock waves on colour centre concentrations in single crystal (sodium chloride) and sodium bromide. (Author)
AD-654 113 Not available from CFSTI.

UNRESOLVED PROBLEMS IN BRITTLE MATERIAL DESIGN: A CRITICAL LITERATURE REVIEW,
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 11B.
AD-654 119 HC$3.00 MF$0.65

X-RAY STRESS ANALYSIS OF THE BAUSCHINGER EFFECT IN metals.
Picatinny Arsenal Dover N J Ammunition Engineering Directorate
For primary bibliographic entry see Field 7D.
AD-654 142 HC$3.00 MF$0.65

CRACK PROPAGATION STUDIES OF WELDS IN TANTALUM AND COLUMBIUM SHEET.
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 13H.
AD-654 150 HC$3.00 MF$0.65

IMPACT STRENGTH AND RESPONSE OF PROTECTED BRITTLE MODELS OF DEEP SUBMERGENCE STRUCTURES.
Research and development rept.,
Naval Ship Research and Development Center Washington D C Structural Mechanics Lab
S. Zilliacus, and H. Hashmall. Apr 67, 89p
NSRDC-2314

Descriptors: (*Structural shells, Tensile properties), Toughness, Impact shock, Deep submergence, Response, Brittleness, Models (Simulations), Structures, Pressure vessels, Coatings, Protection, Viscoelasticity, Glass, Plastics.

Hemispherical shell models of deep-submergence structures and full-thickness plate (brittle) specimens protected by viscoelastic strain-attenuating material (Adiprene) were subjected to impact by spherical faced projectiles weighing from less than 0.1 to 1100 lb at velocities up to 30 ft/sec. Maximum tensile strain amplitudes in shells were reduced by a factor of 10 or better and contact failures were eliminated by the use of Adiprene. Maximum tensile strains at failure were from 1000 to 2300 micro-in/in for annealed glass plates, and from 3400 to 5800 micro-in/in for chemically strengthened (Herculite) glass plates; glass-reinforced plastic plates could not be damaged (except for crazing cracks between parallel adjacent fibers on the tension surface). Scaling relationships and empirical strain functions for predicting maximum tensile strains in large prototype shells were developed. Data and empirical functions were checked against impact and shell theories of Hertz and Reissner with fairly good agreement resulting. (Author)
AD-654 165 HC$3.00 MF$0.65

PM-2A REACTOR VESSEL TEST PROGRAM.
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 13.
IN-1061 HC$3.00 MF$0.65

THE PROPAGATION OF CRACKS OF FINITE WIDTH.
Atomic Energy of Canada, Ltd., Chalk River (Ontario). Nuclear Labs.
M. R. Piggott. Feb 67, 28p AECL-2847

Descriptors: *Crack propagation, *Elastoplasticity, *Plastic material, Brittleness, Crack, Failure, Finite, Flow, Ideal, Material, Plastic, Propagation, Strength, Stress, Theory, Width.

For abstract, see STAR 05 15.
N67-27897 HC$3.00 MF$0.65

STUDY OF PARENT METAL FOR USE IN RESEARCH INTO BRITTLE FRACTURE OF LARGE WELDMENTS QUARTERLY REPORT, 1 JUL. - 30 SEP. 1965.
Institut de Recherches de La Siderurgie, Saint-germain-en-laye (France).
Oct 65, 20p EURAEC-1499, EUR-2657

Descriptors: *Brittleness, *Fracture, *Metal, *Welded structure, Analysis, Chemical, Core, Cycling, Steel, Stress, Structure, Surface, Thermal, Transformation, Welding.

For abstract, see STAR 05 15.
N67-27920 HC$3.00 MF$0.65

BUCKLING OF RECTANGULAR SANDWICH PLATES UNDER BIAXIAL COMPRESSION.
Nationaal Lucht-en Ruimtevaartlaboratorium, Amsterdam (Netherlands).
T. B. De Tonghe, and F. J. Plantema. Oct 66, 38p NLR-TN-S-641
Submitted for Publication

Descriptors: *Axial compression, *Buckling, *Rectangular plate, *Sandwich plate, Analysis, Axial, Biaxis, Compression, Curve, Interaction, Load, Numerical, Plate, Rectangle, Sandwich.

For abstract, see STAR 05 15.
N67-27933 HC$3.00 MF$0.65

FRACTURE TOUGHNESS OF WIDE 2014- T6 ALUMINUM SHEET AT -320 DEG F.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
T. W. Orange. Jun 67, 36p NASA-TN-D-4017
Contract 124-08-08-19-22

Descriptors: *Aluminum alloy, *Fracture toughness, *Stress and load, Alloy, Aluminum, Analysis, Crack, Effect, Fracture, Load, Metal, Method, Notch, Propagation, Sheet, Size, Specimen, Stress, Temperature, Test, Toughness, Yield.

For abstract, see STAR 05 15.
N67-28297 HC$3.00 MF$0.65

UNIAXIAL AND BIAXIAL FRACTURE TOUGHNESS OF EXTRA-LOW-INTERSTITIAL 5 AL-2.5 SN TITANIUM ALLOY SHEET AT 20 DEG K.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
T. L. Sullivan. Jun 67, 22p NASA-TN-D-4016
Contract 124-08-08-19-22

Descriptors: *Fracture toughness, *Notch sensitivity, *Sheet metal, *Titanium alloy, Alloy, Aluminum, Calculation, Crack, Effect, Fracture, Interstitial, Length, Low grade, Metal, Notch, Propagation, Sensitivity, Sheet, Temperature, Tin, Titanium, Toughness, Width.

For abstract, see STAR 05 15.
N67-28299 HC$3.00 MF$0.65

LOW CYCLE FATIGUE OF NOTCHED SPECIMENS BY CONSIDERATION OF CRACK INITIATION AND PROPAGATION.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
M. H. Hirschberg, and S. S. Manson. Jun 67, 29p NASA-TN-D-3146
Contract 129-03-15-06-22

Descriptors: *Crack propagation, *Fatigue, *Notched metal, Aluminum, Analysis, Crack, Cycle, Elastic, Formation, Metal, Notch, Prediction, Propagation, Steel, Strain, Stress, Surface.

For abstract, see STAR 05 15.
N67-28371 HC$3.00 MF$0.65

PLASTIC DEFORMATION IN ORDERED SOLID SOLUTIONS AND ITS EFFECTS ON PHYSICAL PROPERTIES FINAL REPORT.
Centro Atomico Bariloche (Argentina).
A. E. Vidoz. 1966, 16p REPT.-3, AD-651192
Contract DA-ARO-49-092-65-G83

Descriptors: *Physical property, *Plastic deformation, *Solid solution, Activation, Alloy, Copper, Creep, Crystal, Deformation, Gold, Hall effect, Hardening, Heat, Iron, Nickel, Physical, Plastic, Property, Single, Solid, Solution, Stress, Work.

For abstract, see STAR 05 15.
N67-28554 HC$3.00 MF$0.65

DESIGN OPTIMIZATION OF SANDWICH NOSE FAIRINGS.
Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
1 Mar 65, 22p NASA-CR-84832, LMSC/HREC-A710778
Contracts NAS8-11148, NAS8-15485

Descriptors: *Fairing, *Nose, *Sandwich construction, *Saturn launch vehicle, Computer, Construction, Design, Evaluation, Geometry, Launch, Load, Optimization, Program, Ring, Sandwich, Shape, Stiffener, Structure, Vehicle, Weight.

For abstract, see STAR 05 15.
N67-28837 HC$3.00 MF$0.65

CREEP DEFORMATION AND BUCKLING OF A COLUMN WITH AN ARBITRARY CROSS SECTION,
Aeronautical Research Inst. of Sweden, Stockholm.
Ake Samuelson. 1967, 33p FFA-107

Descriptors: (*Beams (Structural), Deformation), Creep, Buckling (Mechanics), Stresses, Difference equations, Numerical analysis, Theory, Sweden.

The general equations for a column with an arbitrary cross section, subjected to secondary creep, were derived, using a 'multi-flange' model in order to take into account and to predict a non-linear stress distribution. The equations were solved numerically by means of finite difference methods. A large number of calculations were carried out in order to demonstrate the abilities and limitations of the method. The maximum deflection was found to approach large values within a short interval of time, thus defining exactly the critical time. The shape of the cross section was found to have a significant influence on the creep buckling time and for a non-symmetric section, the direction of buckling was also of importance. Comparisons with other theories based on similar assumptions showed good agreements. The results of an experimental investigation were reported, and comparisons with the theory were carried out. Although the number of tests was rather limited, the results seemed to confirm the predictions provided by the theory. The block diagram and FORTRAN IV program for the numerical treatment are given. (Author)
PB-174 846 HC$3.00 MF$0.65

20L. SOLID STATE PHYSICS

LOW ENERGY QUANTA IMAGE TRANDUCERS USING A CONTROLLED RECOMBINATION MODE,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20C.
AD-653 401 Not available from CFSTI.

THREE-PHOTON PHOTOELECTRIC EFFECT IN GOLD,
Cornell Univ Ithaca N Y Lab of Atomic and Solid State Physics
For primary bibliographic entry see Field 20C.
AD-653 490 Not available from CFSTI.

F' AND M' TRAPS IN ALKALI HALIDES STUDIED BY MEANS OF PHOTOSTIMULATED THERMOLUMINESCENCE,
Milan Univ (Italy) Istituto Di Fisica
P. Scaramelli. 31 Mar 66, 14p
AFOSR-67-1342
Grant AF-EOAR-07-65
Availability: Published in Il Nuovo Cimento v45 Ser10 p119-31 Oct 11 1966.

Descriptors: (*Alkali metal compounds, Color centers), (*Color centers, Thermoluminescence), (*Crystal lattice defects, Thermoluminescence), Sodium chloride, Potassium compounds, Chlorides, Bromides, Excitation, Absorption spectrum, Band spectrum, Emissivity, Heat of activation, Single crystals, Italy.
Identifiers: Potassium bromide, Potassium chloride.

The nature of some traps in NaCl, KCl, KBr is investigated by means of correlated experiments on photostimulated thermoluminescence and optical absorption. The glow peaks centered at 149K in KBr and at 340K in NaCl are due to the thermal release of F' electrons; the activation energy E and the frequency Nu-0, characteristic of the F' glow peaks in NaCl, KCl, KBr are: E-F' (NaCl)= (0.91 plus or minus 0.06)eV, E-F' (KCl)= (0.537 plus or minus 0.005)eV, E-F' (KBr)= (0.35 plus or minus 0.01); log nu-0 (NaCl)=12-3 plus or minus 0.5, log nu-0 (KCl)=11.4 plus or minus 0.2, log nu-0 (KBr)=11.1 plus or minus 0.3. Furthermore, comparison of photostimulated thermoluminescence measurements with optical absorption at the maximum of the M Band strongly suggests that the traps which are responsible for the glow bands at 228 and 241K in NaCl are due to M' centers. (Author)
AD-653 496 Not available from CFSTI.

HEAVILY DOPED SILICON AS A LOW TEMPERATURE TRANSMISSION FILTER FOR THE FAR INFRARED,
Massachusetts Inst of Tech Cambridge National Magnet Lab
For primary bibliographic entry see Field 20F.
AD-653 497 Not available from CFSTI.

GALLIUM ARSENIDE SEMICONDUCTOR MATERIALS,
Foreign Technology Div Wright-Patterson AFB Ohio
Chen-sze Chao. 25 Jan 67, 9p Rept no. FTD-HT-66-580
TT-67-62095
Edited trans. of Wu-Hsien Tien (Chinese People's Republic), n6 p3; 15 1965.

Descriptors: (*Semiconductors, *Gallium arsenides), Electrical properties, Radiation damage, Semiconductor devices, Lasers, Reviews, China.

The document is based on a translation of a foreign (non-Chinese) paper, the origin of which is not

mentioned. Desirable features of gallium arsenide include high electron migration rate, high operating temperature, high operating voltage, and high radiation resistance. Gallium arsenide elements are capable of operating at +300 to -180C. Possession of a high radiation-resistant property enables the use of gallium arsenide elements in artificial satellites and space vehicles. Gallium arsenide reactance tubes have a cutoff frequency beyond 800 kmc, and gallium arsenide switch tubes have a switching speed lower than 10 to the -9th power sec. A gallium arsenide laser having a luminous efficiency of 60% and a high output power has been developed. The laser can be used for short-distance communications, microwave modulation, and electronic computer control. (Author)
AD-653 506 HC$3.00 MF$0.65

RARE EARTH RESEARCH CONFERENCE (6th), May 3-5, 1967, GATLINBURG, TENNESSEE.
Oak Ridge National Lab Tenn
For primary bibliographic entry see Field 13H.
AD-653 605 HC$3.00 MF$0.65

PHYSICS OF VIBRONIC TRANSITIONS IN THE SPECTRA OF RARE EARTH IONS IN CRYSTALS.
Final rept., 15 Nov 65 - 15 Nov 66,
Hebrew Univ Jerusalem (Israel) Microwave Div
W. Low, and S. Yatsiv. 25 Feb 67, 44p
Grant AF-EOAR-21-66

Descriptors: (*Rare earth elements, *Infrared spectroscopy), (*Gadolinium, Spectra (Infrared)), (*Crystal lattice defects, Rare earth elements), Calcium fluorides, Impurities, Hydrogen, Interactions, Electron transitions, Absorption spectrum, Spectra (Visible + ultraviolet), Doping, Annealing, Concentration (Chemistry), Deuterated compounds, Israel.

Vibronic transitions due to the existence of a gadolinium ion adjacent to a H (-) ion in CaF2 were investigated. The association of the RE (3+) and the H (-) ion in the host lattice is manifested by: (1) The appearance of new infra-red absorption frequencies which are not observed in undoped and hydrogenated CaF2. The frequencies depend on the particular RE ion doping. (2) Observation of new electronic transitions in the near U.V. of gadolinium due to new sites adjacent to an H (-) ion. (3) Observation of vibronic transitions separated from the corresponding parent transitions of the RE ion by the infra-red absorption frequency of the localized H (-). The IR, electronic and vibronic spectra are strongly dependent on the concentration of the RE doping, the particular dopant and the mode of annealing. Conclusions can be derived from comparison of hydrogenated and deuterated crystals. (Author)
AD-653 634 HC$3.00 MF$0.65

OPTICAL PHONON SCATTERING IN THE QUANTUM LIMIT,
Royal Inst of Tech Stockholm (Sweden) Microwave Dept
B. Magnusson, and P. Weissglas. 17 Mar 67, 12p
Rept no. Scientific-18
RADC-TR-67-37
Contract AF 61 (052)-895

Descriptors: (*Semiconductors, Magnetic properties), (*Photons, Scattering), Band theory of solids, Electrons, Polarization, Electric fields, Optical properties, Distribution functions, Partial differential equations, Sweden.

The rate of momentum and energy relaxation of electrons in a polar semiconductor in a strong magnetic field is calculated. It is shown that the low field mobility in very strong magnetic fields is lower than in the fieldfree case but that the magnetoresistance at weaker applied fields also may be negative. To first order in the applied electric field the net energy of the electrons is shown to remain constant, but as a fraction of the average electron energy is in the form of translational energy the electron temperature drops below the lattice temperature as in the absence of a magnetic field. (Author)
AD-653 637 HC$3.00 MF$0.65

ANGULAR EFFECTS IN A MILLIMETER WAVE SEMICONDUCTOR INTERFEROMETER.
Army Electronics Command Fort Monmouth N J
For primary bibliographic entry see Field 20F.
AD-653 646 HC$3.00 MF$0.65

PRESSURE SHIFT OF THE Cr LEVELS IN Al2O3,
Aerospace Research Labs Wright-Patterson AFB Ohio
D. W. Langer, and R. N. Euwema. Aug 66, 7p Rept no. ARL-67-0073
Availability: Published in Journal Phys. Chem. Solids v28 p463-5 1967.

Descriptors: (*Ruby, Line spectrum), (*Chromium, Line spectrum), Atomic energy levels, Alumina, Crystal lattice defects, Impurities, Pressure.

The pressure coefficient of the ruby R lines was measured to have the constant value of -0.9 plus or minus 0.05/cm/kbar up to 10 kbar. Some previously determined Ruby level shifts are combined with this result to find the pressure coefficients of the crystal field parameter Dq, and of the Racah B and C parameters for Cr (3+) in Al2O3. (Author)
AD-653 658 Not available from CFSTI.

EFFECTS OF ELECTRON BOMBARDMENT ON SINGLE-CRYSTAL CdSe AT 77K,
Aerospace Research Labs Wright-Patterson AFB Ohio
B. A. Kulp. 21 Jul 66, 7p Rept no. ARL-67-0090
Availability: Published in Journal of Applied Physics v37 n13 p4936-8 Dec 1966.

Descriptors: (*Semiconductors, *Radiation damage), (*Cadmium selenides, *Electron bombardment), Fluorescence, Continuous spectrum, Crystal lattice defects, Annealing, Excitation.

A threshold for electron radiation damage in CdSe is observed at 250 keV. A fluorescence emission band is produced with a peak intensity at 1.25 microns. Only a slight amount of annealing takes place up to 125C. Above 150C the fluorescence band at 1.25 microns increases in intensity due to heat treatment alone. The fluorescence can be removed by annealing at 500C in excess selenium or cadmium. (Author)
AD-653 664 Not available from CFSTI.

EXCITATION SPECTRA OF GROUP III IMPURITIES IN GERMANIUM UNDER UNIAXIAL STRESS,
Massachusetts Inst of Tech Lexington Lincoln Lab
D. H. Dickey, and J. O. Dimmock. 3 Oct 66, 15p
Rept no. JA-2903
ESD-TR-67-258
Contract AF 19 (628)-5167
Availability: Published in J. Phys. Chem. Solids v28 p529-42 1967.

Descriptors: (*Semiconductors, Spectroscopy), (*Germanium, Impurities), (*Gallium, Absorption spectrum), (*Indium, Absorption spectrum), (*Thallium, Absorption spectrum), Crystal lattice defects, Stresses, Excitation, Line spectrum, Selection rules, Wave functions, Ground state, Atomic energy levels, Band theory of solids.

The absorption spectra of Ga, In and Tl impurities in Ge were measured using polarized radiation with uniaxial stress along the /100/ and /111/ crystallographic directions. The experimental lines were identified using group theoretical selection rules and estimates of the polarized line intensities obtained from the acceptor state wave functions. From this identification the splittings of the acceptor ground state and the three excited states corresponding to the B, C and D lines were determined. From the acceptor ground state splitting the splitting of the valence band edge in Ge and the corresponding deformation potential parameters can be obtained. The values determined are b = + 0.9 plus or minus 0.1 eV and d = + 2.1 plus or minus 0.2 eV. (Author)
AD-653 671 Not available from CFSTI.

INTERBAND MAGNETOOPTICAL STUDIES OF SEMICONDUCTORS AND SEMIMETALS,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20J.
AD-653 672 Not available from CFSTI.

PROPERTIES OF MERCURY CHALCOGENIDES,
Massachusetts Inst of Tech Lexington Lincoln Lab
Theodore C. Harman. Mar 65, 52p Rept no. JA-2509
ESD-TR-67-248
Contract AF 19 (628)-5167
Availability: Published in Physics and Chemistry of II-VI Compounds Chap-15 p769-816 1967.

Descriptors: (*Mercury compounds, Chalcogens), (*Selenides, Mercury compounds), (*Tellurides, Mercury compounds), Semiconductors, Crystal structure, Chemical bonds, Crystal lattices, Symmetry (Crystallography), Etching, Phase diagrams, Synthesis (Chemistry), Crystal growth, Impurities, Solid solutions, Films, Band theory of solids, Transport properties, Hall effect, Electromagnetic properties, Thermal properties, Optical properties, Elasticity, Pressure, Reviews.
Identifiers: Mercuric selenide, Mercuric telluride.

The status, as of the end of 1964, of investigations on the crystal structure, chemical bonding, phase diagrams, preparation of materials, various physical properties and the band structure of mercury telluride, mercury selenide and various alloys are discussed. (Author)
AD-653 688 Not available from CFSTI.

LOW TEMPERATURE CRYSTALLOGRAPHIC AND MAGNETIC STUDY OF LaCoO3.
Revised ed.,
Massachusetts Inst of Tech Lexington Lincoln Lab
Norman Menyuk, Kirby Dwight, and Paul M. Raccah. 24 Oct 66, 10p Rept no. JA-2837
ESD-TR-67-251
Contract AF 19 (628)-5167
Revision of manuscript submitted 28 Jul 66.
Availability: Published in J. Phys. Chem. Solids v28 p549-56 1967.

Descriptors: (*Lanthanum compounds, Low-temperature research), (*Cobalt compounds, Low-temperature research), (*Single crystals, Lanthanum compounds), Synthesis (Chemistry), Neutron diffraction analysis, Symmetry (Crystallography), Crystallography, Magnetic properties, Hysteresis, Magnetic moments, Ferromagnetism.
Identifiers: Cobaltates, Lanthanum cobaltates.

The structural and magnetic properties of LaCoO3 between 300 and 4.2K were studied. Previous investigators have usually reported the existence of a local maximum in the susceptibility at 90K in this material, but a recent single crystal study by Naiman and coworkers indicated no such phenomenon. It was found that the magnetic properties in chemically pure materials are strongly dependent on the method of preparation. Samples

both with and without a susceptibility maximum were studied using neutron diffraction and with a vibrating-coil magnetometer. An anomalously rapid increase of magnetic moment with decreasing temperature was observed below 40K in a field of 10 kOe. The presence of a small ferromagnetic component was established by the presence of hysteresis at 4.2K, a trace of this hysteresis remaining at 77K. The magnetic moment, as measured in 200 Oe, was found to decrease gradually with increasing temperature above 4.2K. The absence of any abrupt drop indicates the remanent moment to be due to isolated regions of a magnetic phase dispersed in a non-magnetic matrix. It was concluded that variations in the size and number of these regions are the cause of the discrepancies between observed magnetic properties of different samples of LaCoO3, that they are virtually unavoidable because of near-degeneracy with the bulk diamagnetic phase, and that their presence precludes definitive measurement of the low-temperature susceptibility of LaCoO3.
AD-653 689 Not available from CFSTI.

CHARACTERIZATION OF d ELECTRONS IN SOLIDS BY STRUCTURE. II. SPONTANEOUS CRYSTALLOGRAPHIC DISTORTIONS,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20B.
AD-653 691 Not available from CFSTI.

THE CONDUCTION BANDS 6H AND 15R SILICON CARBIDE - II ABSORPTION MEASUREMENTS.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
T. S. Moss, and B. Ellis. Dec 66, 23p Rept no. RAE-TR-66381

Descriptors: (*Semiconductors, *Infrared spectroscopy), (*Carriers (Semiconductors), Absorption spectrum), (*Silicon carbides, *Band theory of solids), Band spectrum, Anisotropy, Symmetry (Crystallography), Relaxation time, Spectra (Infrared), Great Britain.

It is shown, that the free carrier absorption in a uniaxial semi-conductor is characterized by two independent absorption coefficients. For a general multivalley model these coefficients are complicated functions of the effective mass and relaxation time tensors but are simplified if the energy extrema are located on the symmetry axis. In this case the anisotropy of the effective mass and also that of the relaxation time may be obtained from the absorption coefficients if these are measured both at high frequencies and also in the low frequency region in the same specimen. At long wavelengths (approx. 20 microns) the absorption coefficients approach limiting values as predicted by the theoretical expressions for low frequencies. From these results the effective mass in the direction of symmetry axis was found to be 1.5 plus or minus 0.2 mo in the 6H polytype and approx. 0.53 mo in the 15R polytype, the relaxation time appropriate to the axial direction was found to be greater than that for the transverse plane by a factor of 2.5 in the 6H form and 1.6 in the 15R form.
AD-653 694 HC$3.00 MF$0.65

SEMICONDUCTING GLASSES.
Technical rept.,
Rensselaer Polytechnic Inst Troy N Y
J. D. Mackenzie. May 67, 9p Rept no. TR-5
Contract Nonr-591 (21)
Availability: Published in Electronic Components Conference Proceedings, Washington, D. C. p11-6 1967.

Descriptors: (*Glass, *Semiconductors), Physical properties, Conductivity, Oxides, Photoconductivity, Mica, Selenium, Chalcogens, Reviews.

Semiconducting glasses can be conveniently divided into two general types, the oxides and the nonoxides. This paper is a brief review of some of the properties, structure, conduction mechanisms and applications of these semiconducting glasses. Glasses based on oxides are rendered electronically conducting by the simultaneous presence of transition metal ions existing in various valence states. The mechanism of conduction is a charge-transfer type involving carriers of very low mobility. Both n- and p-type glasses have been made with large ranges of electrical resistivity. Some direct applications of these glasses are now known as well as the usefulness of their crystallized products. Besides oxides, a large family of semiconducting glasses also exists which are prepared by the fusion of one or more of the elements: S, Se, As, I, Br, Cl, Sb, P, Si, Ge, Tl and Te. The origin of the carriers is different from that for the oxide glasses. Only p-type glasses have been prepared. Many of these are photoconductors. Under high field conditions, some of these nonoxide glasses can become highly conductive and show switching behavior. (Author)
AD-653 714 Not available from CFSTI.

DIRECT SPIN-LATTICE RELAXATION OF DIVALENT COBALT IONS IN TWO HYDRATED COMPLEXES.
Revised ed.,
Kansas Univ Lawrence Dept of Physics and Astronomy
A. G. Taylor, L. C. Olsen, D. K. Brice, and J. W. Culvahouse. 21 Jul 66, 7p
Revision of manuscript submitted 31 May 66. Research supported in part by NSF and ONR. Prepared in cooperation with Kansas Univ., Manhattan. Computation Center.
Availability: Published in Physical Review v152 n1 p403-8 Dec 2 1966.

Descriptors: (*Cobalt, Hyperfine structure), (*Crystal lattice defects, Cobalt), Relaxation time, Selection rules, Lanthanum compounds, Zinc compounds, Nitrates, Silicates, Nuclear spins, Hydrates, Nuclear magnetic resonance.
Identifiers: Double salts, Lanthanum zinc nitrates, Zinc fluosilicates.

Experimental measurements are reported for the allowed and forbidden relaxation rates in the hyperfine structure of divalent cobalt in the Y site of lanthanum zinc double nitrate and in zinc fluosilicate. The static spin Hamiltonian of the Y ion is characteristic of a large trigonal distortion, and that for the ion in the fluosilicate is characteristic of an intermediate trigonal distortion. The results are fitted by an extension of a theory used elsewhere to fit similar measurements on cobalt in the X site of lanthanum zinc double nitrate. In all three cases, four adjustable constants are allowed by the theory. A good description of all of the many facets of the relaxation is obtained for all three types of sites. (Author)
AD-653 760 Not available from CFSTI.

ELECTRIC-FIELD-INDUCED TRANSITIONS IN THE ELECTRON PARAMAGNETIC RESONANCE OF NON-KRAMERS DOUBLETS,
Kansas Univ Lawrence Dept of Physics and Astronomy
J. W. Culvahouse, David P. Schinke, and Donald L. Foster. 21 Nov 66, 3p
Contract Nonr-2775 (00), Grant NSF-GP-4126
Availability: Published in Physical Review Letters v18 n4 p117-8 Jan 23 1967.

Descriptors: (*Crystal lattice defects, *Paramagnetic resonance), (*Praseodymium, Paramagnetic resonance), Lanthanum compounds, Zinc compounds, Nitrates, Hydrates, Hyperfine structure, Electric fields, Electron transitions, Selection rules, Atomic energy levels, Zeeman effect.
Identifiers: Double salts, Lanthanum zinc nitrates.

It is shown that electric-field-induced transitions are commonly the dominant absorption mechanism for non-Kramers doublets in noncentrosymmetric crystal fields. The dominance arises, in part, for the same reasons that non-Kramers ions exhibit extraordinarily strong spin-lattice coupling, the direct coupling of the levels of the doublet by electric fields of the proper spatial symmetry - a coupling excluded for Kramers doublets by time-inversion symmetry. The dominance is made overwhelming by the suppression of the magnetic transitions when the Zeeman interaction is much larger than the zero-field splitting of the doublet. This effect was verified for the resonance of Pr (3+) ions in the double nitrate crystal La1.98Pr0.02-Zn3 (NO3)6.24H2O. (Author)
AD-653 763 Not available from CFSTI.

PHOTON-ENHANCED FIELD EMISSION FROM CdS SINGLE CRYSTALS,
Oxford Univ (England) Dept of Engineering Science
For primary bibliographic entry see Field 20C.
AD-653 816 Not available from CFSTI.

INSTABILITIES IN A DRIFTING SEMICONDUCTOR PLASMA,
Oxford Univ (England) Dept of Engineering Science
Peter R. McNeill. 8 Aug 66, 4p
AFOSR-67-1388
Grant AF-EOAR-37-65
Availability: Published in Proceedings of the IEEE v54 n11 p1596-7 Nov 1966.

Descriptors: (*Plasma medium, Stability), (*Semiconductors, Plasma medium), Magnetic fields, Indium antimonides, Microwaves, Density, Carriers (Semiconductors), Electric fields.

In order to explain some observations of Microwave emission from InSb a theory was formulated in terms of plasma instabilities involving electrons and holes drifting in a transversal magnetic field. The D.C. conditions leading to a transverse density gradient are perturbed and the H.F. dispersion relation is found and solved taking account of temperature effects. (Author)
AD-653 819 Not available from CFSTI.

MEASUREMENT OF DIFFUSION LENGTHS IN DIRECT-GAP SEMICONDUCTORS BY ELECTRON-BEAM EXCITATION.
Revised ed.,
University of Southern California Los Angeles
David B. Wittry, and David F. Kyser. 1 Aug 66, 10p
AFOSR-67-1391
Grants AF-AFOSR-76-66, NSF-GK-500
Revision of manuscript submitted 9 May 66.
Availability: Published in Journal of Applied Physics v38 n1 p375-82 Jan 1967.

Descriptors: (*Semiconductors, Transport properties), (*Luminescence, Semiconductors), Surface properties, Physical properties, Gallium arsenides, Carriers (Semiconductors), Integral transforms, Experimental data.

In semiconductors having high efficiency for radiative recombination, the voltage dependence of cathodoluminescence may be used to determine the diffusion length and to estimate the surface recombination velocity of excess carriers. Theoretical calculations are based on a knowledge of the Laplace transform of the distribution of excitation with depth as determined from the target absorption correction in electron probe microanalysis or, alternatively, on a Gaussian approximation to the distribution of excitation with depth. Experimental results with accelerating voltages of 5-50 kV indicate values of diffusion length in n-type GaAs ranging from 3.0 microns at low-carrier concentration (5.1 x 10 to the 16th power per cc) to 0.65 microns at high-carrier concentration (3 x 10 to the 18th power per cc). The estimated accuracy

for diffusion lengths between 0.5 and 4 microns is plus or minus 30%. Information is also obtained on the surface recombination velocity and the thickness of a 'dead layer' at the surface. (Author)
AD-653 822 Not available from CFSTI.

HIGH TEMPERATURE HALL EFFECT IN CUPROUS OXIDE,
Arizona State Univ Tempe Dept of Chemistry
For primary bibliographic entry see Field 20C.
AD-653 831 Not available from CFSTI.

CRYOGENIC RESEARCH.
TRW Systems Redondo Beach Calif
For primary bibliographic entry see Field 9B.
AD-653 884 HC$3.00 MF$0.65

CRYSTAL CHEMISTRY AT ELEVATED PRESSURE AND MODERATE TEMPERATURES.
Pennsylvania State Univ University Park Materials Research Lab
For primary bibliographic entry see Field 20B.
AD-653 887 HC$3.00 MF$0.65

NUCLEAR SPIN-LATTICE RELAXATION IN ALKALI HALIDES AT LOW TEMPERATURES,
North Carolina Univ Chapel Hill
C. E. Tarr, L. M. Stacey, and C. V. Briscoe. 25 Aug 66, 8p
AFOSR-67-1353
Contract SD-100, Grant AF-AFOSR-645-64
Availability: Published in Physical Review v155 n2 p272-8 Mar 10 1967.

Descriptors: (*Alkali metal compounds, *Nuclear spins), (*Phonons, Alkali metal compounds), (*Crystal lattices, Alkali metal compounds), Sodium compounds, Lithium compounds, Rubidium compounds, Halides, Bromides, Iodides, Electric moments, Relaxation time.
Identifiers: Lithium bromide, Rubidium iodide, Sodium bromide, Sodium iodide.

The spin-lattice relaxation time T1 was measured for the Br79 and Br81 species in NaBr and LiBr and for the I127 species in NaI and RbI in the temperature range 15-77.3K and also at room temperature, using the 180-90 degree pulse technique. The data were fitted to the Van Kranendonk theory using several theoretical phonon spectra. The Van Kranendonk theory satisfactorily accounts for the gross temperature dependence of T1 over the entire range investigated. A consistent deviation of T1 to larger values than those predicted by the theory was noted in all of the samples in the range approx. = 30-60K. The theory is unable to account for these deviations in detail, but the results indicate that optical-phonon relaxation is important even at these low temperatures. (Author)
AD-653 913 Not available from CFSTI.

THE FINITE AMPLITUDE HELICAL MODE IN SEMICONDUCTOR PLASMAS,
Boeing Scientific Research Labs Seattle Wash Plasma Physics Lab
Roy R. Johnson, and Oeivin Holter. Mar 67, 61p Rept no. D1-82-0571
Prepared in cooperation with Oslo Univ. (Norway). Dept. of Physics.

Descriptors: (*Solid state physics, *Semiconductors), Stability, Ionization, Electric fields, Theory, Equations of motion, Amplitude modulation, Energy, Injection, Diffusion, Plasma oscillations.

The helical instability of a finite amplitude is investigated for the solid state electron-hole plasma. The conditions which govern the behavior of a diffusion limited solid state plasma are ascertained for impact ionization and injection plasmas. The density radial distribution of the solid state plasma column is calculated in the absence of the helical instability. A finite amplitude helix is superimposed on the steady state plasma distribution and the conditions for marginal stability determined. The parameters describing the helical instability are calculated as a function of the amplitude of the superimposed helix. These results are combined with the energy balance theory for the solid state electron-hole plasma to obtain results which may be directly applied to experimental observations. (Author)
AD-653 944 HC$3.00 MF$0.65

SYNTHESIS OF POLYMERS CONTAINING FERROCENENITROGEN WITH A SYSTEM OF CONJUGATED BONDS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7C.
AD-653 957 HC$3.00 MF$0.65

HETEROJUNCTION DEVICES.
Interim rept. no. 2, Dec 65-Dec 66,
Syracuse Univ Research Inst N Y
Richard L. Anderson, Girtz Zeidenbergs, Thomas Huang, David Boyce, and Mark Davis. May 67, 139p
RADC-TR-67-74, RADC-AR2-66
Contract AF 30 (602)-3637
See also AD-635 026.

Descriptors: (*Semiconductor devices, Preparation), Silicon, Epitaxial growth, Gallium arsenides, Gallium alloys, Phosphorus alloys, Electrical properties, Manufacturing methods, Transport properties, Band theory of solids.
Identifiers: Gallium phosphides.

Heterojunctions were prepared by depositing Si epitaxially onto GaAs and GaP substrates using silicon-tellurium compounds as transporting agents. The experimental results are in agreement with the abrupt junction theory for heterojunctions. A quantitative discussion is given for electron tunneling through a Schottky Barrier. An open tube deposition system is described for use in the epitaxial deposition of III-V compounds. Associated water transport problems are discussed. Improvements have been made on a closed tube epitaxial system. A phenomelogical model of the transport and deposition has been formulated which predicts that the ampoule geometry has an appreciable influence on the deposition and may be used as a parameter in the design of an epitaxial system. (Author)
AD-654 001 HC$3.00 MF$0.65

ACOUSTOELECTRIC OSCILLATIONS, CURRENT SATURATION AND ELECTRON DRIFT MOBILITY IN CADMIUM SULPHIDE CRYSTALS,
Forsvarets Forskningsinstitutt Kjeller (Norway)
Andreas Rannesrad. 18 Nov 66, 27p Rept no. Scientific-1, Intern Rapport E-90
AFCRL-67-0285
Contracts AF 61 (052)-484, AF 61 (052)-958

Descriptors: (*Cadmium sulfides, Electrical properties), (*Acoustic properties, Cadmium sulfides), Semiconductors, Mobility, Electric currents, Solid state physics, Piezoelectric crystals.
Identifiers: Acoustoelectric effect.

Interaction between acoustic waves and conduction electrons in the piezoelectric semiconductor CdS is considered. A short theoretical discussion of acoustic amplification, current saturation and the temperature dependence of electron drift mobility is given. Current saturation due to acoustic oscillations in CdS is observed, both in a transverse mode and in a longitudinal mode. A method for determining the threshold field for oscillation, utilizing the build up time for current saturation under applied pulsed dc electric field, is discussed. The threshold field is used to determine the electron drift mobility for photoconducting CdS in the temperature range from 204 degrees K to 438 degrees K. The temperature dependence of the mobility can be described as a combination of scattering from lattice vibration and trapping by two impurity levels.
AD-654 003 HC$3.00 MF$0.65

JUNCTION EFFECTS IN COMPOUND SEMICONDUCTORS.
Status rept.,
Illinois Univ Urbana Dept of Electrical Engineering
N. Holonyak, Jr., M. M. Blouke, B. G. Streetman, M. G. Crawford, and G. E. Stillman. Apr 67, 14p Rept no. 8
AFCRL-67-0292
Contract AF 19 (628)-4337

Descriptors: (*Semiconductors, *Gallium arsenides), Phosphides, Lasers, Stability, Luminescence, Silicon, Excitation, Cadmium selenides, Cadmium sulfides, Selenium, Spectra (Visible + ultraviolet), Doping, Oscillation.

The effect of donor impurity states near the indirect <100> conduction band minima on the direct-indirect transition in Ga (ASP) is discussed. Ultrathin platelet lasers of CdSe and Cd (SeS), including visible spectrum continuous (CW) operation, are described. Instabilities and self-oscillation phenomena in bulk samples of Si compensated with deep levels (Au, Co, etc.) are discussed. (Author)
AD-654 009 HC$3.00 MF$0.65

TEMPERATURE DEPENDENCE OF THE ELASTIC CONSTANTS OF RUBIDIUM,
John Carroll Univ Cleveland Ohio
For primary bibliographic entry see Field 20K.
AD-654 019 Not available from CFSTI.

GENERALIZED MODEL FOR SEMICONDUCTOR RADIATION RESPONSE PREDICTION.
Nortronics Newbury Park Calif Applied Research Dept
For primary bibliographic entry see Field 9A.
AD-654 134 HC$3.00 MF$0.65

SOLID-STATE STUDIES OF OXYGEN-DEFICIENT TANTALUM PENTOXIDE,
Cornell Univ Ithaca N Y Baker Lab of Chemistry
Daniel E. Kudrak, and M. J. Sienko. 21 Oct 66, 9p
AFOSR-67-1437
Grant AF-AFOSR-796-65
Availability: Published in Inorganic Chemistry v6 p880-4 1967.

Descriptors: (*Tantalum compounds, Carriers (Semiconductors)), (*Oxides, Carriers (Semiconductors)), Band theory of solids, Electrical conductance, Hall effect, Magnetic properties, Crystal structure, Single crystals, Voltage.
Identifiers: Tantalum oxide.

Although several lower oxides of tantalum -- i.e., Ta4O, Ta2O, TaO, TaO2, TaO sub x (2<x<2.5) -- have been reported in the literature, only the last, TaO sub x, could be reproduced in the investigation. Single crystals of composition Ta2O4.73 were prepared by vacuum fusion of Ta2O5 in Ta, using radiofrequency induction heating at about 1900C. Potential-probe conductivity studies disclosed metallic behavior, the resistivity rising almost linearly from 0.0063 ohm cm at 4.2K to 0.043 ohm cm at 295K. Hall voltage measurements indicated n-type carriers at densities of 4.5 x 10 to the 20th power/cc, independent of temperature. The Seebeck coefficient was found to change linearly from -10 micro-v/deg at 90K to -50 micro-v/deg at 300K. Magnetic susceptibility, measured by the Curie method, was small and negative. Observed properties are consistent with a d-type conduction-band model in which donor centers are so concentrated that degenerate electron gas beha-

vior results. Density data on single crystals suggest that the oxygen defect actually arises from tantalum interstitials. The thermal dependence of carrier mobility is quantitatively consistent with optical mode lattice scattering. (Author)
AD-654 147 Not available from CFSTI.

THE CONDUCTION BANDS IN 6H AND 15R SILICON CARBIDE. PART 1 - ABSORPTION MEASUREMENTS.
Royal Aircraft Establishment, Farnborough (England).
B. Ellis, and T. S. Moss. Dec 66, 23p RAE-TR-66381

Descriptors: *Absorption coefficient, *Conduction band, *Silicon carbide, Absorption, Anisotropy, Band, Carbide, Coefficient, Conduction, Conductivity, Crystal, Radiation, Relaxation, Semiconductor, Silicon.

For abstract, see STAR 05 15.
N67-27809 HC$3.00 MF$0.65

THE CONDUCTION BANDS IN 6H AND 15R SILICON CARBIDE. PART 1 - HALL EFFECT AND INFRARED FARADAY ROTATION MEASUREMENTS.
Royal Aircraft Establishment, Farnborough (England).
B. Ellis, and T. S. Moss. Dec 66, 22p RAE-TR-66380

Descriptors: *Conduction band, *Faraday rotation, *Hall effect, *Silicon carbide, Band, Carbide, Carrier, Concentration, Conduction, Crystal, Induction, Infrared, Isotropy, Magnetic, Silicon.

For abstract, see STAR 05 15.
N67-27810 HC$3.00 MF$0.65

FUNDAMENTAL STUDIES OF THE METALLURGICAL, ELECTRICAL, AND OPTICAL PROPERTIES OF GALLIUM PHOSPHIDE QUARTERLY PROGRESS REPORT, JAN. 1 - MAR. 31, 1967.
Stanford Univ., Calif. Solid-state Electronics Labs.
31 Mar 67, 54p NASA-CR-84660
Grant NSG-555

Descriptors: *Gallium phosphide, *Optical property, *Photoelectricity, Cobalt, Crystal, Diffusion, Donor, Electric, Gallium, Impurity, Iron, Junction, Metallurgy, Optical, Phosphide, Property, Zinc.

For abstract, see STAR 05 15.
N67-28014 HC$3.00 MF$0.65

SOME PECULIARITIES OF THE VOLT-AMPERE CHARACTERISTICS OF THIN CADMIUM SULFIDE SINGLE CRYSTALS WITH NONOHMIC CONTACTS.
Nekotoryye Osobennosti Vol'tampernykh Kharakteristik Tonkikh Monokristallov Sul'fida Kadmiya S Neomicheskimi Kontaktami
International Information, Inc., Philadelphia, Pa.
A. S. Gershun, L. A. Sysoyev, and B. L. Timan.
Dec 66, 4p NASA-TT-F-10469
Contract NASW-1499
Transl. Into English From Fiz. Tverd. Tela (Moscow), V. 8, No. 5, 1966

Descriptors: *Cadmium sulfide, *Nonohmic effect, *Single crystal, *Volt-ampere characteristics, Ampere, Cadmium, Characteristics, Contact, Crystal, Current, Electrode, Graph, Indium, Room, Single, Strength, Sulfide, Temperature, Thin, Volt.

For abstract, see STAR 05 15.
N67-28226 HC$3.00 MF$0.65

PHOTOGRAPHIC STUDY OF CONDENSING MERCURY FLOW IN 0- G AND 1- G ENVIRONMENTS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 15.
N67-28739 HC$3.00 MF$0.65

IDENTITIES, INFINITE CONDUCTIVITY AND MEISSNER EFFECT OF ELECTRON-PHONON GAS.
Nuklearni Institut Jozef Stefan, Ljubljana (Yugoslavia).
L. Picman. Dec 66, 10p NIJS-R-496

Descriptors: *Conductivity, *Electron-phonon interaction, *Meissner effect, Bethe-salpeter equation, Conservation, Electron, Equation, Excitation, Gas, Green function, Interaction, Kinetic, Law, Linear, Momentum, Phonon, Superconductivity.

For abstract, see STAR 05 15.
N67-28870 HC$3.00 MF$0.65

SOLID STATE DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING DECEMBER 31, 1966.
Oak Ridge National Lab., Tenn.
Mar 67,
Contract W-7405-eng-26

Descriptors: (*Solid state physics, Single crystals), (*Radiation damage, metallurgy), Neutron scattering, Phonons, Color centers.

For abstract, see NSA 21 13.
ORNL-4098 HC$3.00 MF$0.65

20M. THERMODYNAMICS

EXTRATERRESTRIAL LIFE,
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 6C.
AD-653 411 Not available from CFSTI.

ANALOG-DIGITAL DEVICE FOR MODELING PROBLEMS OF NONSTATIONARY THERMAL CONDUCTIVITY,
Foreign Technology Div Wright-Patterson AFB Ohio
V. V. Ilin, G. I. Vasilev, I. B. Novikov, and R. P. Tevalova. 23 Jan 67, 7p Rept no. FTD-HT-66-712
Unedited rough draft trans. of Patent (USSR) 175 750, appl. no. 912383/16-24 18 Jul 64.

Descriptors: (*Analog-to-digital converters, Patents), (*Thermal conductivity, *Simulators), Design, Networks, Commutators, USSR.

The device contains a network of ohmic resistances and a device for setting the boundary conditions. To increase the accuracy of simulation, the device contains a code-to-analog converter for each node, which operates alternately in a storage and a voltage setting mode. There is also one analog-to-code converter common to all the nodes, which is connected sequentially through an electronic switch to the nodes of the network. Codes proportional to the voltages at these points are supplied to the inputs of the code-to-analog converters operating in the storage mode.
AD-653 551 HC$3.00 MF$0.65

EXPERIMENTAL DETERMINATION OF COEFFICIENT OF THERMAL CONDUCTIVITY OF A CESIUM PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-653 555 HC$3.00 MF$0.65

THE EFFECT OF WALL TEMPERATURE ON THE LOW REYNOLDS NUMBER HYPERSONIC STAGNATION REGION SHOCK LAYER.
Princeton Univ N J Gas Dynamics Lab
For primary bibliographic entry see Field 20D.
AD-653 659 Not available from CFSTI.

A FREE BOUNDARY PROBLEM FOR THE HEAT EQUATION WITH PRESCRIBED FLUX AT BOTH FIXED FACE AND MELTING INTERFACE
Rocketdyne Canoga Park Calif
B. Sherman. 10 Jun 66, 13p
AFOSR-67-1361
Contract AF 49 (638)-1679
Availability: Published in Quarterly of Applied Mathematics v25 n1 p53-63 Apr 1967.

Descriptors: (*Liquids, *Thermodynamics), Interfaces, Melting, Integral equations, Boundary value problems, Temperature.

A mathematical determination is made of the temperature distribution in a liquid and the position of the melting interface.
AD-653 803 Not available from CFSTI.

MEASUREMENTS OF RADIATIVE FLUX DIVERGENCE IN THE ARCTIC.
Washington Univ Seattle Dept of Atmospheric Sciences
For primary bibliographic entry see Field 4A.
AD-653 808 Not available from CFSTI.

ON THE STATISTICAL INTERPRETATION OF THERMODYNAMIC ENTROPY IN A STRONGLY COUPLED GAS,
Brussels Univ (Belgium) Faculte des Sciences
G. Nicolis. 12 Sep 66, 5p
AFOSR-67-1382
Grant AF-EOAR-52-64
Availability: Published in The Journal of Chemical Physics v46 n2 p702-4 Jan 15 1967.

Descriptors: (*Statistical mechanics, *Entropy), Gases, Kinetic theory, Thermodynamics, Statistical distributions, Distribution functions, Belgium.

The first strong-coupling contribution to the canonical entropy of a classical gas is analyzed in the simple case of a Gaussian potential. In agreement with the results by Prigogine et al., it is shown that two different kinds of contributions appear and that only one of them can be identified with the thermodynamical entropy. (Author)
AD-653 815 Not available from CFSTI.

CONVECTIVE ELEMENTS.
Washington Univ Seattle Dept of Atmospheric Sciences
For primary bibliographic entry see Field 4A.
AD-653 849 HC$3.00 MF$0.65

TRANSIENT TEMPERATURE DISTRIBUTION IN A SOLID SPHERE DUE TO AERODYNAMIC HEATING,
Polytechnic Inst of Brooklyn N Y Dept of Aerospace Engineering and Applied Mechanics
For primary bibliographic entry see Field 20D.
AD-653 873 HC$3.00 MF$0.65

THE INVARIANT IMBEDDING EQUATIONS FOR THE DISSIPATION FUNCTIONS OF AN INHOMOGENEOUS FINITE SLAB WITH ANISOTROPIC SCATTERING,
Rand Corp Santa Monica Calif
R. Bellman, H. Kagiwada, R. Kalaba, and S.

Ueno. Jun 67. 28p Rept no. RM-5146-PR
Contract F44620-67-C-0045

Descriptors: (*Thermal radiation, Mathematical analysis), (*Atmosphere, Optical properties), Photons, Boundary value problems, Numerical methods and procedures, Heat transfer, Scattering, Planetary atmospheres, Light, Transport properties.
Identifiers: Dissipation function.

This report considers the absorption of photons incident to an atmosphere, to the case of an inhomogeneous atmosphere and anisotropic scattering. By use of the invariant imbedding technique, two complete sets of integro-differential equations are derived--the first for the case of monodirectional illumination of the upper boundary, and the second for monodirectional illumination of the lower boundary--using the equations of transfer and taking into account the polarity of the optical properties of the atmosphere. In both sets, the equations and results for scattering and transmission in the homogeneous case reduce to those given by Chandrasekhar.
AD-653 923 HC$3.00 MF$0.65

CONVECTION IN A BOX: LINEAR THEORY,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 20D.
AD-653 924 HC$3.00 MF$0.65

THE THERMODYNAMICS OF THE MAGNESIUM SILICATE/MAGNESIUM-SILICON-OXYGEN VAPOR SYSTEM,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 11B.
AD-653 925 HC$3.00 MF$0.65

ON THE HEAT EFFECT OF THE 15-MICRON BAND OF CARBON DIOXIDE IN THE UPPER ATMOSPHERE,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 4A.
AD-653 931 HC$3.00 MF$0.65

METHOD OF COMPUTING THE DEVIATION FROM KIRCHOFF'S LAW IN THE MESOSPHERE FOR THE TRANSFER OF RADIATION IN THE 15-MICRON BAND OF CARBON DIOXIDE,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 4A.
AD-653 933 HC$3.00 MF$0.65

APPROXIMATION OF THE SINGLE LINE DURING THE TRANSFER OF RADIANT ENERGY IN THE UPPER ATMOSPHERE,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 4A.
AD-653 935 HC$3.00 MF$0.65

EXPERIMENTAL DETERMINATION OF THE LAW OF HEAT EXCHANGE FOR THE TURBULENT BOUNDARY LAYER IN A SUPERSONIC FLOW,
Foreign Technology Div Wright-Patterson AFB Ohio
L. V. Kozlov. 23 Jan 67, 20p Rept no. FTD-HT-66-379
TT-67-62137
Eksperimentalnoe Opredelenie Zakona Teploobmena dlya Turbulentnogo Pogranichnogo Sloya v Sverkhzvukovom Potoke. Unedited rough draft trans. of mono. Issledovanie Teploobmena v Potokakh Zhidkosti i Gaza, Moscow, 1965 p91-102.

Descriptors: (*Turbulent boundary layer, Heat transfer), (*Supersonic flow, *Heat transfer), Mach number, Temperature, Integral equations, Mathematical analysis, USSR.

It is concluded that: (1) the nondimensional heat-transfer coefficient obtained through the use of flow parameters taken at the wall temperature depends on the temperature factor and only weakly on the Mach number; (2) the obtained empirical formulas are to be used for calculating heat transfer in the range of M, Re, and temperature values considered; (3) the empirical relationships expressed by local properties of the boundary layer are obtained, and may be regarded as complementary relations in the form of the heat transfer law in the integral equation of the boundary layer for a body of arbitrary shape with zero or negative gradients of velocity or temperature.
AD-653 956 HC$3.00 MF$0.65

A PROGRAM FOR CALCULATING RADIATION FLOW AND HYDRODYNAMIC MOTION,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 20D.
AD-653 965 HC$3.00 MF$0.65

THERMODYNAMIC PROPERTIES OF ORGANIC DERIVATIVES OF THE LIGHTER ELEMENTS.
Bureau of Mines Bartlesville Okla Petroleum Research Center
For primary bibliographic entry see Field 7D.
AD-653 986 HC$3.00 MF$0.65

ON THE SOLAR DIFFERENTIAL ROTATION AND MERIDIONAL CURRENTS,
Aerospace Corp El Segundo Calif Labs Div
For primary bibliographic entry see Field 3B.
AD-653 987 HC$3.00 MF$0.65

SOME REMARKS ABOUT SPINWAVES AND ZERO SOUND IN LOW TEMPERATURE LIQUID He (3),
Brandeis Univ Waltham Mass Dept of Physics
For primary bibliographic entry see Field 20J.
AD-654 015 HC$3.00 MF$0.65

RADIATIVE TRANSFER. I. THE FLUX-TEMPERATURE RELATION AND NON-GRAY STELLAR ATMOSPHERES.
California Univ Berkeley Dept of Astronomy
For primary bibliographic entry see Field 3B.
AD-654 021 Not available from CFSTI.

THERMAL RADIATION PHENOMENA. VOLUME I. THE EQUILIBRIUM THERMODYNAMIC PROPERTIES OF HIGH TEMPERATURE AIR,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
Forrest R. Gilmore. May 67, 340p Rept no. LMSC-3-27-67-1-Vol-I
DASA-1971-1
See also Volume 2, AD-654 055.

Descriptors: (*Air, *Thermal radiation), Thermodynamics, Atomic energy levels, High-temperature research, Diatomic molecules, Chemical equilibrium, Nitrogen, Oxygen, Carbon dioxide, Argon, Tables, Atmosphere.

Contents: Air an a mixture of ideal gases in chemical equilibrium; Ideal gas properties for monatomic gases; Ideal gas properties for diatomic gases; Ideal gas properties for polyatomic gases; Effects of interparticle forces on the thermodynamic properties of air; Effects of Coulomb forces on the thermodynamic properties of air; Equilibrium calculations and results for air; Tables and graphs; Composition and properties of the atmosphere.
AD-654 054 HC$3.00 MF$0.65

THERMAL RADIATION PHENOMENA. VOLUME II. THE EQUILIBRIUM RADIATIVE PROPERTIES OF AIR - THEORY,
Locheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
B. H. Armstrong, and R. W. Nicholls. May 67, 497p Rept no. LMSC-3-27-67-1-Vol-2
DASA-1971-2
See also Volume 1, AD-654 054.

Descriptors: (*Air, *Thermal radiation), Thermodynamics, Heat transfer, Theory, High-temperature research, Quantum mechanics, Molecular properties, Absorption spectrum, Carbon dioxide, Nitrogen, Oxygen, Argon.

Contents: Theory of radiation in hot gases (elementary radiative transfer, theory of radiation, theory of molecular absorption); Spectral and mean absorption coefficients of heated air (historical review: research on hot gas absorption coefficients since 1900, general features of air absorption coefficients, molecular absorption coefficients, atomic absorption coefficients); Spectroscopic properties of six important band systems which contribute to the opacity of heated air.
AD-654 055 HC$3.00 MF$0.65

EQUILIBRATION OF A SINGLE-SPECIES TWO-TEMPERATURE GAS MIXTURE,
Northwestern Univ Evanston Ill Technological Inst
Fro primary bibliographic entry see Field 20D.
AD-654 096 Not available from CFSTI.

HEAT TRANSFER AND BINARY DIFFUSION WITH THERMODYNAMIC COUPLING IN VARIABLE-PROPERTY FORCED CONVECTION ON A FLAT PLATE.
Revised ed.,
Clarkson Coll of Technology Potsdam N Y
William N. Gill, and Dale W. Zeh. 16 May 66, 10p
Contract Nonr-5053 (01)
Prepared in cooperation with Syracuse Univ., N. Y. Revision of manuscript submitted 14 Mar 66.
Availability: Published in A.I.Ch.E Journal v13 n1 p140-7 Jan 1967.

Descriptors: (*Thermodynamics, *Gas flow), Heat transfer, Diffusion, Mass transfer, Flat plate models, Convection (Heat transfer), Laminar boundary layer, Momentum, Injection, Hydrogen, Helium, Carbon dioxide, Slender bodies.

The variable-property, laminar, boundary-layer equations, which describe simultaneous momentum, heat, and binary mass transfer with thermodynamic coupling, are analyzed for air flows over a flat plate with the injection of foreign gases through the solid surface. A simplified general treatment of thermodynamic coupling is developed and applied to yield approximate but accurate expressions for evaluating heat transfer rates and adiabatic wall temperatures for injection of hydrogen, helium, and carbon dioxide. This method explains why the driving force based on (T sub w - T sub aw) can be used to correlate heat transfer results for situations where diffusion thermo is important. Furthermore, and perhaps most significant, the method provides a simple error estimate for the correlation obtained by using the adiabatic wall temperature. It is shown that the injection of lightweight gases can significantly reduce viscous dissipation in flows over slender bodies and that diffusion thermo and dissipation effects can be of the same order of magnitude even for reasonably high-velocity flows. These effects are discussed in terms of convenient quantities, called sigma functions. (Author)
AD-654 141 Not available from CFSTI.

THERMAL PROPERTIES OF GOLD-SILICON BINARY ALLOY NEAR THE EUTECTIC COMPOSITION.
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
For primary bibliographic entry see Field 11F.
AD-654 167 HC$3.00 MF$0.65

THERMAL EVIDENCE OF A GLASS TRANSITION IN GOLD-SILICON-GERMANIUM ALLOY.
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
For primary bibliographic entry see Field 11F.
AD-654 168 HC$3.00 MF$0.65

THE DETERMINATION OF THE THERMODYNAMIC STATE OF RELAXING HYPERSONIC GAS FLOWS BY ELECTRON BEAM TECHNIQUE.
Aerodynamische Versuchsanstalt, Gottingen (West Germany). Abteilung Aerodynamik.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 15.
N67-27935 HC$3.00 MF$0.65

STUDY ON BURNOUT HEAT FLUX IN BOILING WATER QUARTERLY REPORT NO. 17, 1 OCT. - 31 DEC. 1965.
Maschinenfabrik Augsburg-nurnberg A. G., Nuremberg (West Germany).
F. Mayinger, O. Schad, and E. Weiss. Jan 66, 42p EURAEC-1550, EUR-2692
Contract EURATOM-057-61-RDD

Descriptors: *Boiling, *Burnout, *Heat flux, Channel, Compressible, Critical, Film, Flux, Heat, Hydrodynamics, Inlet, Orifice, Pulse, Structural, Thermodynamics, Water.

For abstract, see STAR 05 15.
N67-28211 HC$3.00 MF$0.65

SWIRL FLOWS IN BOILING WATER. CRITICAL FLUX IN SWIRL FLOW IN A TUBE.
Societe Nationale D Etude Et de Construction de Moteurs D Aviation, Suresnes (France). Division Atomique.
J. Dolfe, A. Rosuel, J. Sandrin, and G. Sourioux. 18 Oct 65, 45p EURAEC-1544
Contract EURATOM-0-61-64-7-TEE-F/RD/ Its Spec. Rept.-21

Descriptors: *Channel, *Enthalpy, *Flux, *Inlet, *Mass flow rate, Boiling, Centrifugation, Critical, Flow, Fluid, Heating, Length, Mass, Mixture, Phase, Rate, Steam, Swirl, Two, Water.

For abstract, see STAR 05 15.
N67-28212 HC$3.00 MF$0.65

GENERATION OF HIGH STAGNATION TEMPERATURES BY PRECOMBUSTION OF HYDROGEN.
Erzeugung Hoher Gesamttemperaturen Durch Wasserstoffverbrennung
Deutsche Forschungsanstalt Fur Luft- Und Raumfahrt, Brunswick (West Germany). Institut Fuer Strahlantriebe.
W. Alvermann. Jan 67, 22p DLR-FB-67-05
in German, English Summary

Descriptors: *Combustion, *Hydrogen, *Stagnation temperature, Air, Equilibrium, Heating, Mach number, Mixture, Oxygen, Pressure, Stagnation, System, Temperature.

For abstract, see STAR 05 15.
N67-28665 HC$3.00 MF$0.65

LOW TEMPERATURE TECHNIQUES AND AERONAUTICS.
Linde A. G., Hollriegelskreuth (West Germany).
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 15.
N67-28702 HC$3.00 MF$0.65

INVESTIGATION ON THE COOLING OF EXHAUST GAS BY DIRECT CONTACT BETWEEN EXHAUST GAS AND WATER.
Untersuchung Uber Abgaskuhlung Bei Direktem Kontakt Zwischen Abgas Und Wasser
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Porz (West Germany).
H. Felder, and J. Herzke. Mar 67, 84p DLR-FB-67-15, DVL-622
in German, English Summary

Descriptors: *Cooling, *Dehydration, *Exhaust gas, Cone, Contact, Coupling, Direct, Equipment, Exhaust, Gas, Hot, Nozzle, Pressure, Suction, Water.

For abstract, see STAR 05 15.
N67-28711 HC$3.00 MF$0.65

APPROXIMATION FOR RADIANT ENERGY TRANSPORT IN NONGRAY, NONSCATTERING GASES.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. W. Patch. Jun 67, 36p NASA-TN-D-4001
Contract 122-28-02-17-22

Descriptors: *Absorption coefficient, *Energy transfer, *Gas transport, *Radiant energy, Absorption, Approximation, Coefficient, Energy, Gas, Integration, Method, Nongray, Propulsion, Radiance, Rocket, Scattering, Transfer, Transport.

For abstract, see STAR 05 15.
N67-28737 HC$3.00 MF$0.65

EXPERIMENTAL AND ANALYTICAL STUDY OF THE TRANSIENT SOLIDIFICATION OF A WARM LIQUID FLOWING OVER A CHILLED FLAT PLATE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. M. Savino, and R. Siegel. Jun 67, 37p NASA-TN-D-4015
Contract 129-01-09-02-22

Descriptors: *Flat plate, *Freezing, *Ice, *Solidification, Alcohol, Coolant, Cryogenic, Exchanger, Flat, Growth, Heat, Layer, Liquid, Plate, Prediction, Thin, Water.

For abstract, see STAR 05 15.
N67-28738 HC$3.00 MF$0.65

THE DETERMINATION OF THERMAL CONDUCTIVITY BY MEANS OF MELTING PHENOMENA.
Royal Aircraft Establishment, Farnborough (England).
P. H. Bishop, and K. F. Rogers. Oct 66, 23p RAE-TR-66328

Descriptors: *Melting, *Thermoconductivity, Ice, Insulator, Measurement, Metal, Plate, Powder, Temperature, Wax.

For abstract, see STAR 05 15.
N67-28806 HC$3.00 MF$0.65

HEAT TRANSFER TO LIQUID-METAL FLOW IN A ROUND TUBE OR FLAT DUCT WITH HEAT SOURCES IN THE FLUID STREAM.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. M. Inman. Jun 66, 33p NASA-TN-D-3473

Descriptors: *Heat transfer, *Liquid metal, *Temperature distribution, Channel, Characteristics, Circle, Convection, Distribution, Dynamics, Flow, Fluid, Force, Heat, Liquid, Metal, Parallel, Plate, Profile, Temperature, Transfer, Tube, Velocity.

For abstract, see STAR 05 15.
N67-28821 HC$3.00 MF$0.65

20N. WAVE PROPAGATION

RESEARCH-ENGINEERING AND SUPPORT FOR TROPICAL COMMUNICATIONS.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 17B.
AD-653 608 HC$3.00 MF$0.65

INITIAL VHF PROPAGATION RESULTS USING XELEDOP TECHNIQUES AND LOW ANTENNA HEIGHTS.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 17B.
AD-653 609 HC$3.00 MF$0.65

RESEARCH-ENGINEERING AND SUPPORT FOR TROPICAL COMMUNICATIONS.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 17B.
AD-653 615 HC$3.00 MF$0.65

ANGULAR EFFECTS IN A MILLIMETER WAVE SEMICONDUCTOR INTERFEROMETER.
Army Electronics Command Fort Monmouth N J
For primary bibliographic entry see Field 20F.
AD-653 646 HC$3.00 MF$0.65

ABSORPTION PEAK FOR ULTRASONIC WAVES NEAR THE SPIN-FLOP TRANSITION OF UNIAXIAL ANTIFERROMAGNETS.
Massachusetts Inst of Tech Cambridge National Magnet Lab
For primary bibliographic entry see Field 20A.
AD-653 903 Not available from CFSTI.

SUR L'ETUDE DE L'AMPLITUDE DU CHAMP RADIOELECTRIQUE D'UN SATELLITE A L'HORIZON DE LA STATION (On the Study of the Amplitude of the Radioelectric Field of a Satellite at the Horizon of the Station),
Advisory Group for Aerospace Research and Development Paris (France)
J. F. Aurejac, and J. Papet-Lepine. 1966, 34p
Rept no. AGARD-553
NATO Furnished. Text in French; attached summary in English.

Descriptors: (*Radio transmission, Scientific satellites), Very high frequency, Ionospheric propagation, Scintillation, Atmospheric refraction, Electron density, France.

Using a 40 Mc/s high gain aerial which can be pointed in all directions of azimuth, the Val-Joyeux station can receive signals from the satellite 'Explorer 22' for all revolutions from 330 degrees to 206 degrees of longitude W when passing over the Equator. In extreme cases this represents a distance between the satellite and the observer which is sometimes more than 5,000 km. Because of a very long journey in the ionosphere, it is possible to show a considerable increase in the refraction effects and in the effect of irregularities in the distribution of the electron density in the environment traversed. Thus a large increase in scintillations is observed when the angle of elevation is approximately 20 degrees or less. This increase in scintillations is particularly noticeable towards the North, but also towards the South. In the latter case some cor elation between magnetic activity and the scintillation coefficients has been observed. A systematic comparison with the results obtained by other stations is then made to define the areas giving rise to such scintillations. (Author)
AD-653 930 HC$3.00 MF$0.65

21. PROPULSION AND FUELS

21B. COMBUSTION AND IGNITION

FLIGHT REGIMES OF A VEHICLE WITH A RAMJET ENGINE WHICH PROVIDE FOR CONSTANT CONDITIONS OF FLAME STABILIZATION,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21E.
AD-653 541 HC$3.00 MF$0.65

IGNITION IN HIGH PRESSURE OXYGEN.
British Oxygen Co., Ltd., London (England). Research and Development Dept.
M. Guter. Feb 67, 56p S+T-MEMO-13/50
Sponsored in Part By Min. of Supply

Descriptors: *High pressure oxygen, *Oxygen, Alloy, Flow, High pressure, Ignition, Ignition temperature, Lubricant, Metal, Polymer, Rate, Rubber, Synthetic, Temperature, Valve.

For abstract, see STAR 05 15.
N67-27788 HC$3.00 MF$0.65

GENERATION OF HIGH STAGNATION TEMPERATURES BY PRECOMBUSTION OF HYDROGEN.
Deutsche Forschungsanstalt Fur Luft- Und Raumfahrt, Brunswick (West Germany). Institut Fuer Strahlantriebe.
For primary bibliographic entry see Field 20M.
For abstract, see STAR 05 15.
N67-28665 HC$3.00 MF$0.65

TWO-STAGE COMBUSTION OF EXPLOSIVE MIXTURES. III - KINETIC ZONES OF SPONTANEOUS IGNITION OF ISO-OCTANE IN MIXTURES WITH AIR AT HIGH PRESSURES.
Shell Research, Ltd., Chester (England). Thornton Research Centre.
S. . Yantovskii. 1966, 11p TIL/OT-8331, TRANS-1124
Transl. Into English From Kinetika I Kataliz (USSR), V. 7, No. 1, Jan.-feb. 1966 P 21-26

Descriptors: *Hydrocarbon combustion, *Octane, *Spontaneous ignition temperature, Air, Combustion, Explosive, Flame, Heptane, Hydrocarbon, Ignition, Kinetics, Mixture, Oxidation, Spontaneous, Temperature.

For abstract, see STAR 05 15.
N67-28861 HC$3.00 MF$0.65

21C. ELECTRIC PROPULSION

LITHIUM-MOIST AIR BATTERY.
Globe-Union Inc Milwaukee Wis Applied Research Labs
For primary bibliographic entry see Field 10C.
AD-653 774 HC$3.00 MF$0.65

HIGH ENERGY ELECTROCHEMICAL COUPLES. II. GAS ELECTRODES IN ORGANIC SOLVENTS.
American Univ Washington D C
For primary bibliographic entry see Field 10C.
AD-653 779 HC$3.00 MF$0.65

21D. FUELS

REDUCTION OF THE CALCITE CONTENT OF GROUND SHALE BY LIQUID-LIQUID PARTICLE TRANSFER,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
For primary bibliographic entry see Field 7A.
AD-653 417 Not available from CFSTI.

21E. JET AND GAS TURBINE ENGINES

STUDY OF VARIABLE TURBINE GEOMETRY FOR SMALL GAS TURBINE ENGINES.
Final rept., 22 Jun-22 Dec 66,
General Motors Corp Indianapolis Ind Allison Div
Robert L. Messerlie, and Dean M. Con. Apr 67, 111p Rept no. EDR-4965
USAAVLABS-TR-67-19
Contract DA-44-177-AMC-425 (T)

Descriptors: (*Gas turbines, Configuration), Performance (Engineering), Turboprop engines, Turbofan engines, Shafts, Design, Efficiency.

An analytical investigation of the transient and steady-state performance of a series of gas-turbine engines utilizing variable geometry in the turbine was completed. Shaft-power engines with and without regeneration and incorporating either free- or single-shaft configurations were investigated at compressor pressure ratios of 10 and 16. In addition free-shaft, simple-cycle, high bypass, fan engines were evaluated using the 10- and 16-pressure-ratio gas generators for the high pressure system. Extensive use was made of the IBM 7094 II digital computer to analyze both the turbine and overall engine performance. (Author)
AD-653 430 HC$3.00 MF$0.65

FLIGHT REGIMES OF A VEHICLE WITH A RAMJET ENGINE WHICH PROVIDE FOR CONSTANT CONDITIONS OF FLAME STABILIZATION,
Foreign Technology Div Wright-Patterson AFB Ohio
V. N. Gruzdev, and A. V. Talantov. 28 Feb 67, 17p Rept no. FTD-HT-67-24
TT-67-62110
Rezhimy Poleta Letatelnogo Apparata s Pryamotochnym Dvigatelem, Obespechivaiushchie Postoianstvo Uslovii Stabilizatsii, unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR) n4 p121-8 1966.

Descriptors: (*Ramjet engines, Performance (Engineering)), (*Combustion, Stabilization), Flames, Combustion chambers, Optimization, Flight, Velocity, Altitude, Shock waves, Flameout, USSR.

An attempt is made to find the flight regimes of a vehicle with a ramjet engine which permits operation of the combustion chamber without flameout. The conditions of flame stabilization in a straight-through combustion chamber with the aid of poorly streamlined bodies (mechanical stabilizers) to a significant extent depend on the physical parameters of the mixture that enters the chamber, i.e., pressure and temperature. The latter, in turn, are functions of the flight regime of the vehicle, i.e., the velocity and altitude of flight (M and H). Thus, the conditions of flame stabilization, in the final result, are determined by the flight regime of the vehicle.
AD-653 541 HC$3.00 MF$0.65

A REVIEW OF THE STATE OF THE ART OF CYCLONE-TYPE SEPARATORS.
Final rept., Jan-Jun 66,
Ohio State Univ Research Foundation Columbus
Alfred C. Pinchak. Mar 67, 71p
ARL-67-0047
Contract AF 33 (615)-1915

Descriptors: (*Centrifuge separation, State-of-the-art reviews), (*Gas turbines, Air intake filters), Dust, Separation, Efficiency, Gas flow, Ingestion (Engines).
Identifiers: Cyclones (Mechanical).

The report represents a brief review of the state of the art of cyclone type separators which may have application in the gas turbine-dust ingestion problem. Experimental data of various investigators are presented. Emphasis is placed on the interaction between the separation efficiency, flow rate, pressure drop, and geometrical parameters. A simple analytical model provided a means for logically comparing the separator's performance reported by different investigators. A review of some recent theoretical advances is also presented. Special consideration is given to the prediction of the fractional separation efficiency and the secondary internal flow patterns. In addition to the standard text references, an extensive bibliography is included which should be of direct relevance to engineers designing high capacity cyclone type separators. (Author)
AD-653 578 HC$3.00 MF$0.65

APPLICATION OF BLUNT TRAILING EDGE BLADINGS TO SUPERSONIC COMPRESSOR STAGES.
Final scientific rept., 30 Apr 66-1 May 67,
Von Karman Inst for Fluid Dynamics Rhode-Saint-Genese (Belgium)
Jacques Chauvin, and Frans Breugelmans. May 67, 73p Rept no. VKI-IN-22
ARL-67-0120
Grant AF-EOAR-65-65

Descriptors: (*Compressor blades, Trailing edge), Blunt bodies, Supersonic flow, Transonic flow, Subsonic flow, Tests, Compressor rotors, Compressor stators, Cascade structures, Belgium.

A review is given of cascade, rotor and stage tests made on blunt trailing edge blades in the high subsonic, the transonic and the supersonic regimes. For what concerns cascade tests, satisfactory high subsonic operation was obtained with turning of the order of 55 degrees. The positive effect of back pressure on the losses was ascertained, as well as the possibility of reducing secondary flow effects by using slots. (Reduction of 50% of the losses at mid-span). The rotor tests on a second generation design showed significant improvement on the first model. A peak total pressure ratio of 2.8 with an adiabatic efficiency close to 85% was reached. The stage tests were made to investigate rotor-stator interference, stagger effect and effect of slotting. An optimum rotor-stator distance and stagger are found. The positive effect of slotting the stator blades is confirmed. (Author)
AD-653 595 HC$3.00 MF$0.65

FLUERIC DIVERTER VALVE,
Harry Diamond Labs Washington D C
For primary bibliographic entry see Field 13G.
AD-653 617 HC$3.00 MF$0.65

BERYLLIDE COMPOSITION 1 2400-DEGREE TURBINE/MATERIALS RESEARCH PROGRAM.
Garrett Corp Phoenix Ariz Airesearch Mfg Div
For primary bibliographic entry see Field 11B.
AD-653 632 HC$3.00 MF$0.65

ON THE OPTIMIZATION OF THE POWER PLANT FOR A SHORT RANGE AIRCRAFT WITH SPECIAL REGARD TO HIGH BY-PASS RATIOS.
Zur Optimierung Der Triebwerksanlage Eines Kurzstreckenflugzeuges Unter Besonderer Beruecksichtigung Hoher By-pass Verhaeltnisse
Vereinigte Flugtechnische Werke G.M.B.H., Bremen (West Germany).

H. Pakendorf. 1966, 41p DGRR/WGLR PAPER-66-085
in German, English Summary Presented At the Ann. Joint Meeting grr/Wglr, Bad Godesberg, W. Germany, Oct. 1966

Descriptors: *By-pass engine, *Optimization, *Turbofan engine, Aircraft, By-pass, Conference, Cost, Design, Engine, Range, Ratio, Short, Turbofan, Weight.

For abstract, see STAR 05 15.
N67-27921 HC$3.00 MF$0.65

21H. ROCKET MOTORS AND ENGINES

AN EVALUATION OF COMPOSITE TEFLON-ALUMINUM FOIL BLADDERS FOR THE SURVEYOR VVERNIER PROPULSION SYSTEMS.
Hughes Aircraft Co., Culver City, Calif. Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
2 Mar 67, 72p NASA-CR-84663, SSD-78020
Contracts NAS7-100, JPL-950056
Prepared for Jpl

Descriptors: *Bladder, *Propulsion system, *Surveyor spacecraft, *Teflon, Aluminum, Foil, Gas, Permeation, Physical, Propellant, Property, Propulsion, Stability, System, Vibration.

For abstract, see STAR 05 15.
N67-28018 HC$3.00 MF$0.65

RESEARCH AND ADVANCED DEVELOPMENT. VOLUME II - SUPPORTING RESEARCH AND TECHNOLOGY FOR THE OFFICE OF ADVANCED RESEARCH AND TECHNOLOGY, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION SEMIANNUAL REVIEW, 1 JUL. - 31 DEC. 1966.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
31 Jan 67, 542p NASA-CR-84793, JPL-TM-33-322, VOL. II
Contract NAS7-100

Descriptors: *Chemical propulsion, *Electric propulsion, *Gas dynamics, *Material testing, *Mathematical statistics, *Spacecraft power supply, Array, Battery, Chemical, Dynamics, Electric, Electronics, Entry, Fluid, Gas, Lunar, Material, Mathematics, Mission, Nuclear, Planetary, Planning, Power, Propulsion, Rocket, Solar, Space vehicle, Spacecraft, Statistics, Supply, Testing.

For abstract, see STAR 05 15.
N67-28641 HC$3.00 MF$0.65

DYNAMIC RESPONSE OF GASEOUS-HYDROGEN FLOW SYSTEM AND ITS APPLICATION TO HIGH-FREQUENCY COMBUSTION INSTABILITY.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
C. E. Feiler, and M. F. Heidmann. Jun 67, 12p NASA-TN-D-4040
Contract 128-31-06-02-22

Descriptors: *Combustion instability, *Dynamic response, *Hydrogen, *Injector, Chamber, Combustion, Coupling, Density, Dynamic, Element, Flow, Gaseous, High frequency, Instability, Lumping, Model, Oscillation, Pressure, Response, System.

For abstract, see STAR 05 15.
N67-28740 HC$3.00 MF$0.65

21I. ROCKET PROPELLANTS

THE SUBSTITUTION OF 1-METHYLHYDRAZINE FOR AMMONIA IN THE GLUTAMINE SYNTHETASE SYSTEM,
School of Aerospace Medicine Brooks AFB Tex
For primary bibliographic entry see Field 6A.
AD-653 685 Not available from CFSTI.

THERMODYNAMIC PROPERTIES OF ORGANIC DERIVATIVES OF THE LIGHTER ELEMENTS.
Bureau of Mines Bartlesville Okla Petroleum Research Center
For primary bibliographic entry see Field 7D.
AD-653 986 HC$3.00 MF$0.65

22. SPACE TECHNOLOGY

22A. ASTRONAUTICS

SCATTERING OF THERMAL ENERGY GAS BEAMS BY METALLIC SURFACES II,
United Aircraft Corp East Hartford Conn Research Labs
For primary bibliographic entry see Field 7D.
AD-653 720 HC$3.00 MF$0.65

MODEL LAWS GOVERNING PARACHUTE PERFORMANCE IN MARTAIN ENVIRONMENT.
Minnesota Univ., Minneapolis.
H. G. Heinrich. 1966, 27p
Presented At the Ann. Joint Meeting grr/Wglr, Bad Godesberg, W. Germany, Oct. 1966 Sponsored in Part By Ge

Descriptors: *Mars environment, *Parachute, *Performance prediction, *Soft landing, Aerodynamic, Air, Atmosphere, Canopy, Constant, Density, Drag, Earth, Entry, Environment, Gravitational, Landing, Layer, Mars (planet), Performance, Porosity, Prediction, Shear, Soft, Spacecraft, Subsonic, Supersonic, Wind.

For abstract, see STAR 05 15.
N67-27805 HC$3.00 MF$0.65

CLASSIFICATION OF MISSIONS EFFECTED BY SPACE VEHICLES LAUNCHED IN THE UNITED STATES.
Classification des Missions de Vehicules Spatiaux Lances Aux Etats Unis
European Space Vehicle Launcher Development Organization, Paris (France). Future Programs Directorate.
M. Gilli. Jan 65, 24p ELDO-TM-F-14
in French

Descriptors: *Space mission, *Spacecraft, *United states, Characteristics, Communications, Element, Launch vehicle, Meteorology, Military, Mission, Navigation, Orbital, Probe, Satellite, Science, Space.

For abstract, see STAR 05 15.
N67-27940 HC$3.00 MF$0.65

RESEARCH RELATED TO AN EXPERIMENTAL TEST OF GENERAL RELATIVITY SEMIANNUAL STATUS REPORT, 1 JUL. - 31 DEC. 1966.
Illinois Univ., Urbana. Coordinated Science Lab.
W. D. Compton, and H. W. Knoebel. Mar 67, 31p NASA-CR-84370
Grant NSG-443

Descriptors: *Gyroscope, *Passive satellite, *Precision, *Relativity, Alignment, Axis, Flash, Gradient, Gravity, Nonmetallic, Passive, Reflection, Satellite, Solar, Spin, Torque.

For abstract, see STAR 05 15.
N67-28003 HC$3.00 MF$0.65

LOW TEMPERATURE TECHNIQUES AND AERONAUTICS.
Linde A. G., Hollriegelskreuth (West Germany).
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 15.
N67-28702 HC$3.00 MF$0.65

SOME THOUGHTS ON UNMANNED LUNAR EXPLORATION.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
D. Stern. Jun 67, 8p NASA-TM-X-55806, X-641-67-268

Descriptors: *Lunar exploration, *Man-machine system, *Remote control, *Unmanned spacecraft, Capacity, Communication, Control, Design, Earth, Exploration, Handling, Locomotion, Lunar, Man-machine, Power, Remote, Robot, Source, System, Task, Unmanned, Visual.

For abstract, see STAR 05 15.
N67-28749 HC$3.00 MF$0.65

SPACE SYSTEMS ANALYSIS AND COMPUTER PROGRAMMING SERVICES QUARTERLY PROGRESS REPORT, 1 JAN. - 31 MAR. 1967.
International Business Machines Corp., Gaithersburg, Md. Scientific Satellite Systems Dept.
For primary bibliographic entry see Field 9B.
For abstract, see STAR 05 15.
N67-28765 HC$3.00 MF$0.65

INTERACTIONS OF SPACECRAFT AND OTHER MOVING BODIES WITH NATURAL PLASMAS.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
C. K. Sterkin. Dec 65, 185p NASA-CR-84819
Contract NAS7-100
Its Lit. Search No. 541

Descriptors: *Abstract, *Bibliography, *Plasma, *Space environment, *Spacecraft, Aircraft, Cosmic, Electric, Environment, Hazard, Instrumentation, Interplanetary, Ionosphere, Magnetic, Magnetosphere, Missile, Property, Satellite, Space.

For abstract, see STAR 05 15.
N67-28768 HC$3.00 MF$0.65

STUDIES OF EXTRATERRESTRIAL DUST AT 40 KILOMETERS (1966) FINAL REPORT.
Litton Systems, Inc., Minneapolis, Minn. Applied Science Div.
H. Anderson, R. Deeter, K. Maffitt, R. Olson, and R. Wood. 1 Feb 67, 57p NASA-CR-84811
Contract NASW-1395

Descriptors: *Air sampling, *Balloon sounding, *Electron, *Extraterrestrial matter, *Stratosphere, Air, Balloon, Cosmic, Dust, Extraterrestrial, Interplanetary, Magnetic, Matter, Microprobe, Microscopy, Nuclear, Probe, Resonance, Sampling, Sounding.

For abstract, see STAR 05 15.
N67-28774 HC$3.00 MF$0.65

MULTIPLE MIDCOURSE MANEUVERS IN INTERPLANETARY GUIDANCE.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 22C.
For abstract, see STAR 05 15.
N67-28800 HC$3.00 MF$0.65

PRELIMINARY PAYLOAD ANALYSIS OF AUTOMATED MARS SAMPLE RETURN MISSIONS.

IIT Research Inst., Chicago, Ill.
J. C. Niehoff. May 67, 146p NASA-CR-84849, M-13
Contract NASR-65/06/

Descriptors: *Automatic control, *Mars probe, *Mission planning, *Payload, *Sampling, Analysis, Automatic, Control, Feasibility, Launch, Mars (planet), Mission, Mode, Phase, Planning, Probe, Return, Spacecraft.

For abstract, see STAR 05 15.
N67-28833 HC$3.00 MF$0.65

THE FIRST ARTIFICIAL MOON SATELLITE - LUNA 10.
Royal Aircraft Establishment, Farnborough (England).
3 May 66, 13p RAE-LIB-TRANS-99

Descriptors: *Circumlunar trajectory, *Lunik x lunar probe, *U.S.S.R. space program, Automatic, Characteristics, Circular, Experiment, Field, Gravitational, Heat, Magnetic, Meteor, News, Report, Station, Trajectory.

For abstract, see STAR 05 15.
N67-28862 HC$3.00 MF$0.65

POSSIBLE INTERPRETATION OF THE RESULTS OF MEASUREMENTS ON THE NEAR-LUNAR SATELLITE "AMS LUNA-10".
Vozmozhnaya Interpretatsiya Rezul'tatov Izmereniy Na Okololunnom Sputnikr Luna-10
Volt Technical Corp., Washington, D. C.
SH. SHDolginov, I. A. Shulin, E. G. Yeroshenko, and L. N. Zhuzgov. 2 Jun 67, 12p NASA-CR-84837, ST-LPS-NLS-10618
Contract NAS5-12487
Transl. Into English From Russian

Descriptors: *Geomagnetism, *Lunar magnetic field, *Lunik x lunar probe, Field, Interaction, Lunar, Magnetic, Magnetosphere, Measurement, Probe, Radiation, Tail, U.S.S.R..

For abstract, see STAR 05 15.
N67-28875 HC$3.00 MF$0.65

22B. SPACECRAFT

THE APPLICATION OF INTEGRATED CIRCUITRY TO SPACECRAFT ELECTRONIC SYSTEMS,
Aerospace Corp., El Segundo, Calif. Technical Operations.
John B. Bryson. Jan 65, 36p TOR-469 (9990)-4
Contract AF 04 (695)-469

Descriptors: (*Integrated circuits, *Spacecraft), Electronics, Performance (Engineering), Electronic equipment, Radiation damage, State-of-the-art reviews, Microminiaturization (Electronics), Circuits, Reliability (Electronics).

The application of integrated circuitry to spacecraft electronic systems is analyzed. The performance and characteristics of state-of-the-art integrated circuits, including reliability and radiation resistance, have been determined. Both analog and digital integrated circuitry is evaluated. A comparison of integrated techniques (monolithic, thin-film, and hybrid) is made for the various requirements of spacecraft systems. (Author)
AD-459 635 HC$3.00

AN INTRODUCTION TO THE PROBLEM OF PHOTOGRAPHING ARTIFICIAL SATELLITES,
Wright Air Development Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3A.
AD-653 405 Not available from CFSTI.

THE USE OF WIND SHEARS IN THE DESIGN OF AEROSPACE VEHICLES,
Advisory Group for Aerospace Research and Development Paris (France)
Robert S. Ryan, and James R. Scoggins. Oct 66, 47p Rept no. AGARD-546
NATO Furnished. Presented at the Meeting of the AGARD, Structures and Materials Panel (23rd), Paris (France), 4-11 Oct 66.

Descriptors: (*Launch vehicles (Aerospace), Design), (*Wind, Shear stresses), Aerospace craft, Gust loads, Aerodynamic characteristics, Turbulence.
Identifiers: Saturn (Booster).

The relative influence of various wind profile properties and disturbances on launch vehicle flight dynamic response is studied. Particular emphasis is placed on the influence of wind shears and turbulence on dynamic response during the boost phase of the flight. Four hundred and seven individual detailed (Jimsphere) wind profiles are the primary wind inputs for this analysis. Time response of the vehicle to each profile is computed and a statistical evaluation of the results made. Results are obtained for the Saturn V space vehicle and conclusions drawn as to the relative influence of wind shears and turbulence versus the degree of refinement of the dynamic model of the space vehicle. (Author)
AD-653 928 HC$3.00 MF$0.65

A DETAILED STUDY OF CONTAMINANTS PRODUCED BY MAN IN A SPACE CABIN SIMULATOR AT 760 MM. HG.
School of Aerospace Medicine Brooks AFB Tex
For primary bibliographic entry see Field 6S.
AD-653 932 HC$3.00 MF$0.65

IONOSPHERIC RESEARCH USING SATELLITES.
University Coll Nairobi (Kenya) Dept of Physics
For primary bibliographic entry see Field 4A.
AD-653 950 HC$3.00 MF$0.65

ROCKET INSTRUMENTATION FOR AURORAL MEASUREMENTS - BLACK BRANT AC 17.604,
Utah Univ Salt Lake City Upper Air Research Labs
For primary bibliographic entry see Field 4A.
AD-653 992 HC$3.00 MF$0.65

SURVEY OF IONOSPHERIC IRREGULARITIES OVER EUROPE,
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 4A.
AD-654 036 HC$3.00 MF$0.65

CLASSIFICATION OF MISSIONS EFFECTED BY SPACE VEHICLES LAUNCHED IN THE U.S.S.R..
Classification des Missions des Vehicules Spatiaux Lances en U.R.S.S.
European Space Vehicle Launcher Development Organization, Paris (France). Basic Techniques Div.
M. Gilli. Mar 65, 23p ELDO-TM-F-16
in French

Descriptors: *Launch vehicle, *Space mission, *U.S.S.R. space program, Biosatellite, Classification, Cosmos satellite, Elektron satellite, Element, Evaluation, Mission, Orbital, Polyot satellite, Probe, Program, Reconnaissance, Satellite, Space, Spacecraft, Sputnik satellite, U.S.S.R., Voskhod manned spacecraft, Vostok spacecraft.

For abstract, see STAR 05 15.
N67-27927 HC$3.00 MF$0.65

ON THE DEVELOPMENTAL WORK OF A RECOVERABLE SOUNDING ROCKET. PROJECT 621.
Bericht Ueber Die Entwicklungsarbeiten An Einer Rueckfuehrbaren Hoehenforschungsrakete
Dornier-werke G.M.B.H., Friedrichshafen (West Germany).
W. Pittelkow. 1966, 16p DGRR/WGLR PAPER-66-057
in German, English Summary Presented At the Ann. Joint Meeting grr/Wglr, Bad Godesberg, W. Germany, Oct. 1966

Descriptors: *Dornier paraglider rocket, *Paraswing, *Recoverable space vehicle, *Sounding rocket, Apogee, Conference, Fin, Guidance, Paraglider, Recovery, Rocket, Sounding, Space, Stabilization, Trajectory, Vehicle.

For abstract, see STAR 05 15.
N67-27936 HC$3.00 MF$0.65

WHERE IS THE DANGER HIDDEN (QUES) APROPOS THE CAPE KENNEDY TRAGEDY.
Volt Technical Corp., Washington, D. C.
Y. Marinin. 6 Feb 67, 4p NASA-CR-84671, ST-PR-10559-SP
Contract NAS5-12487
Transl. Into English From U.S.S.R. Press Circ. 1.Ii. 67 Apn

Descriptors: *Apollo spacecraft, *U.S.S.R., Astronaut, Cape kennedy, Crew, Fire, Oxygen, Press, Release.

For abstract, see STAR 05 15.
N67-28017 HC$3.00 MF$0.65

AN EVALUATION OF COMPOSITE TEFLON-ALUMINUM FOIL BLADDERS FOR THE SURVEYOR VVERNIER PROPULSION SYSTEMS.
Hughes Aircraft Co., Culver City, Calif. Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
For primary bibliographic entry see Field 21H.
For abstract, see STAR 05 15.
N67-28018 HC$3.00 MF$0.65

OPTIMAL ACOUSTIC ENVIRONMENT FOR SPACECRAFT CABINS.
Nekotoryye Voprosy Formirovaniya Optimal'noy Akusticheskoy Sredy V Kabinakh Kosmicheskikh Korabley
Holman (John F.) and Co., Inc., Washington, D.C.
YU. V.Hrylov, V. S. Kuznetsov, and YE. M.Yuganov. Jun 67, 9p NASA-TT-F-10980
Contract NASW-1495
Transl. Into English From Izv. Akad. Nauk Sssr. Ser. Biol. (Moscow), V. 31, No. 1, 1966 P 14-20

Descriptors: *Habitability, *Long period effect, *Manned spacecraft, *Psychoacoustics, *Space cabin, Cabin, Composition, Control, Effect, Intensity, Level, Long, Manned, Mission, Noise, Optimum, Parameter, Period, Regulation, Signal, Space, Spacecraft, Spectral.

For abstract, see STAR 05 15.
N67-28221 HC$3.00 MF$0.65

NUTATIONAL STABILITY OF MULTI-BODY SPINE- STABILIZED SATELLITES.
Royal Aircraft Establishment, Farnborough (England).
W. G. Hughes. Jan 67, 14p RAE-TR-67009

Descriptors: *Nutational oscillation, *Satellite, *Spin stabilization, Amplitude, Angular, Axis, Body, Damper, Despinning, Momentum, Motion, Nutation, Oscillation, Reaction, Rigid, Spacecraft, Spin, Stability, Stabilization, Three, Torque, Velocity.

For abstract, see STAR 05 15.
N67-28363 HC$3.00 MF$0.65

RESEARCH AND ADVANCED DEVELOPMENT. VOLUME II - SUPPORTING RESEARCH AND TECHNOLOGY FOR THE OFFICE OF ADVANCED RESEARCH AND TECHNOLOGY, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION SEMIANNUAL REVIEW, 1 JUL. - 31 DEC. 1966.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
For primary bibliographic entry see Field 21H.
For abstract, see STAR 05 15.
N67-28641 HC$3.00 MF$0.65

BAKER- NUNN PHOTOGRAPHY OF THE INTELSAT 2- F2 APOGEE-MOTOR FIRING.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
20 Mar 67, 11p NASA-CR-84799, SAO SPECIAL REPT.-237
Grant NSG-87-60

Descriptors: *Baker-nunn camera, *Intelsat satellite, *Optical tracking, *Satellite photography, Apogee, Camera, Firing, Motor, Optical, Orbit, Photography, Prediction, Satellite, Synchronous, Tracking.

For abstract, see STAR 05 15.
N67-28766 HC$3.00 MF$0.65

POWER SYSTEM CONFIGURATION STUDY AND RELIABILITY ANALYSIS QUARTERLY PROGRESS REPORT, 7 JAN. - 6 APR. 1967.
TRW Systems Group, Redondo Beach, Calif.
For primary bibliographic entry see Field 10A.
For abstract, see STAR 05 15.
N67-28771 HC$3.00 MF$0.65

DESIGN OPTIMIZATION OF SANDWICH NOSE FAIRINGS.
Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
For primary bibliographic entry see Field 20K.
For abstract, see STAR 05 15.
N67-28837 HC$3.00 MF$0.65

THE SPACE SYSTEM "METEOR" SERVES METEOROLOGISTS.
Volt Technical Corp., Washington, D. C.
8 Jun 67, 4p NASA-CR-84836, ST-PR-10622
Contract NAS5-12487
Transl. Into English From Pravda (Moscow), 4 Jun. 1967

Descriptors: *Cosmos satellite, *Meteorological satellite, Data, Instrumentation, Meteorology, News, Processing, U.S.S.R..

For abstract, see STAR 05 15.
N67-28874 HC$3.00 MF$0.65

HIGHLIGHTS OF PRESS RELEASES ON THE "SALON DU BOURGET".
Volt Technical Corp., Washington, D. C.
31 May 67, 6p NASA-CR-84881, ST-PR-10616
Contract NAS5-12487
Transl. Into English From Pravda (Moscow), 27 May 1967 and From le Monde (Paris), 27 May 1967

Descriptors: *Interplanetary spacecraft, *Scientific satellite, *U.S.S.R. space program, *Vostok spacecraft, Communications, Cosmos satellite, Elektron satellite, Exhibition, Interplanetary, Launch vehicle, Lunar, Meteorology, Satellite, Science, Spacecraft, Venus.

For abstract, see STAR 05 15.
N67-28929 HC$3.00 MF$0.65

22C. SPACECRAFT TRAJECTORIES AND REENTRY

TRAJECTORY OPTIMIZATION TECHNIQUES.
Grumman Aircraft Engineering Corp Bethpage N Y Research Dept
Richard E. Kopp, and H. Gardner Moyer. 1966, 29p
AFOSR-67-1377
Contracts AF 49 (638)-1207, AF 49 (638)-1512
Availability: Published in Advances in Control Systems v4 p103-55 New York Academic Press, Inc., 1966.

Descriptors: (*Trajectories, *Optimization), (*Calculus of variations, Optimization), Algorithms, Numerical methods and procedures, Problem solving, Equations, Algebraic topology, Digital computers, Series.

During the past eight years, the most significant achievements made in the area of trajectory optimization have been in the application of large-scale digital computers to the solution of trajectory optimization problems, which are more than of mere academic interest. Today, there are many algorithms from which to choose; therefore the practicing engineer is being faced primarily with the question of which algorithm to choose for solving the problem, rather than the question of whether the problem can be solved at all. From this situation, however, one should not form the impression that all problems are merely routine. Many areas still remain for the improvement of existing methods, as well as for the development of new techniques. Certain difficulties still remain (singular problems particularly) that defy classical methods, and the entire question of global optimality hardly ever is considered. The purpose of this chapter is to introduce the engineer to the algorithms with which the authors have had personnel experience, those encountered while solving trajectory optimization problems. The exclusion of any method does not detract from the value of the particular method, but is merely an indication that the authors at this time have had little, if any, personal experience using the method for the solution of practical engineering problems. (Author)
AD-653 812 Not available from CFSTI.

THE ORBIT OF INJUN 3 ROCKET (1962 BETA TAU 6) FOR 20 APRIL TO 1 MAY 1966.
Royal Aircraft Establishment, Farnborough (England).
D. W. Scott. Dec 66, 16p RAE-TR-66395

Descriptors: *Injun iii satellite, *Orbital element, Angular, Ascent, Eccentricity, Element, Inclination, Method, Motion, Optical, Orbital, Perigee, Radar, Right, Satellite.

For abstract, see STAR 05 15.
N67-27795 HC$3.00 MF$0.65

DESIGN CRITERIA FOR A HIGH SPEED TEST FACILITY WITH ARC HEATER AND MHD-ACCELERATOR FOR SIMULATION OF ATMOSPHERIC ENTRY.
Industrieanlagen-betriebsgesellschaft M.B.H., Ottobrunn (West Germany).
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 15.
N67-27806 HC$3.00 MF$0.65

ON THE USE OF CERTAIN FIRST INTEGRALS OF THEORETICAL MECHANICS IN SPACE PROBLEMS.
European Space Vehicle Launcher Development Organization, Paris (France). Basic Techniques Div.
E. Cambi. May 65, 7p ELDO-TM-F-19

Descriptors: *Integral, *Librational motion, *Space mechanics, Angular, Energy, First, Hamiltonian, Liapunov function, Libration, Mechanics, Momentum, Motion, Satellite, Space, Theoretical, Vehicle.

For abstract, see STAR 05 15.
N67-27928 HC$3.00 MF$0.65

COVERAGE BY A NETWORK OF TELEMETRY AND TRACKING STATIONS OF SATELLITES ON NEAR-EARTH ORBITS.
Covverture D'un Reseau de Stations de Telemesure Et de Trajectographie des Satellites Proches de La Terre
European Space Technology Center, Delft (Netherlands).
R. Fraysse. Feb 66, 49p ESRO-TM-9
in French, English Summary

Descriptors: *Satellite tracking, *Telemetry, *Tracking station, Calculation, Circular, Coverage, Earth, Ellipticity, Graph, Method, Near, Network, Numerical, Orbit, Satellite, Station, Tracking.

For abstract, see STAR 05 15.
N67-27929 HC$3.00 MF$0.65

DETERMINATION OF A ROCKET'S ATTITUDE BY A PROGRESSIVE METHOD USING TWO REFERENCE VECTORS.
Determination de l'Attitude D'une Fusee Par Une Methode Progressive Utilisant Deux Vecteurs de Reference
Royal Aircraft Establishment, Farnborough (England).
F. Bertin. Nov 66, 21p RAE-LIB-TRANS-1183
Transl. Into English From Astronaut. Acta (Vienna), V. 9, No. 5-6, 1963 P 371-384

Descriptors: *Attitude indicator, *Digital computer, *Solar cell, *Space orientation, Angle, Angular, Attitude, Calculation, Cell, Coefficient, Computer, Digital, Error, Indicator, Magnetic, Orientation, Progression, Sensor, Signal, Solar, Spacecraft, Velocity.

For abstract, see STAR 05 15.
N67-28709 HC$3.00 MF$0.65

THE INFLUENCE OF TRACKING STATION LOCATION UNCERTAINTIES ON SATELLITE ORBIT ERRORS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
D. W. Koch. 5 Apr 67, 12p NASA-TM-X-55804, X-507-67-207

Descriptors: *Position error, *Root-mean-square error, *Satellite tracking, *Spacecraft orbit, *Tracking station, Analysis, Earth, Error, Location, Orbit, Position, Satellite, Spacecraft, State, Station, Tracking, Uncertainty, Vector, Velocity.

For abstract, see STAR 05 15.
N67-28747 HC$3.00 MF$0.65

SYSTEMATIC CORRECTIONS TO REDUCE CERTAIN SATELLITE POSITIONS TO THE FK4 SYSTEM.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
For primary bibliographic entry see Field 3A.
For abstract, see STAR 05 15.
N67-28760 HC$3.00 MF$0.65

ADAPTIVE FILTERING INTERIM REPORT.
Analytical Mechanics Associates, Inc., Lanham, Md.

A. E. Bailie, and A. H. Jazwinski. Mar 67, 23p NASA-CR-84794, REPT.-67-6
Contract NAS5-9085

Descriptors: *Adaptive filter, *Covariance, *Gaussian noise, *White noise, Adaptive, Calculation, Divergence, Dynamics, Error, Feedback, Filter, Input, Mathematics, Model, Noise, Orbit, White.

For abstract, see STAR 05 15.
N67-28762 HC$3.00 MF$0.65

ESTIMATION OF STATE WITH ACCEPTABLE ACCU JACY CONSTRAINTS INTERIM REPORT.
Analytical Mechanics Associates, Westbury, N.Y.
For primary bibliographic entry see Field 12A.
For abstract, see STAR 05 15.
N67-28763 HC$3.00 MF$0.65

THE PROBABILITY OF MISSION SUCCESS (POMS).
Analytical Mechanics Associates, Westbury, N.Y.
W. Denham, and J. Mohan. Oct 65, 25p NASA-CR-84815
Contract NAS5-9085

Descriptors: *Probability, *Space flight, *Trajectory optimization, Computer, Covariance, Matrix, Mission, Optimization, Perturbation, Planning, Program, Statistics, Trajectory, Translunar.

For abstract, see STAR 05 15.
N67-28772 HC$3.00 MF$0.65

SPACE TRAJECTORIES AND ERRORS IN TIME, FREQUENCY, AND TRACKING STATION LOCATION.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
F. O. Vonbrun. Apr 67, 19p NASA-TM-X-55798, X-507-67-163

Descriptors: *Frequency synchronization, *Time factor, *Tracking station, *Trajectory analysis, Analysis, Error, Factor, Frequency, Ground, Instrument, Measuring, Radar, Range, Station, Synchronization, System, Tracking, Trajectory.

For abstract, see STAR 05 15.
N67-28797 HC$3.00 MF$0.65

MULTIPLE MIDCOURSE MANEUVERS IN INTERPLANETARY GUIDANCE.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A. Ghaffari. Jun 66, 16p NASA-TM-X-55788, X-507-66-254

Descriptors: *Flyby mission, *Interplanetary flight, *Spacecraft maneuver, Correction, Error, Flight, Flyby, Guidance, Impulse, Interplanetary, Jupiter (planet), Maneuver, Mission, Optimization, Spacecraft, Spacing, Spin, Stabilization, Target, Trajectory.

For abstract, see STAR 05 15.
N67-28800 HC$3.00 MF$0.65

A NUMERICAL THEORY OF SATELLITES IN BRENDEL'S COORDINATES.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
P. Musen. Jun 67, 21p NASA-TN-D-4002

Descriptors: *Inclination, *Orbital calculation, *Satellite orbit, Angle, Calculation, Convergence, Coordinate, Iteration, Lunar, Motion, Number, Orbit, Plane, Resonance, Satellite, Sun, System, Theory.

For abstract, see STAR 05 15.
N67-28822 HC$3.00 MF$0.65

ON THE PROBLEM OF COMET ORBIT DETERMINATION FOR SPACECRAFT INTERCEPT MISSIONS.
IIT Research Inst., Chicago, Ill.
A. L. Friedlander. May 67, 89p NASA-CR-84848, T-19
Contract NASR-65/06/

Descriptors: *Comet, *Interception, *Orbit calculation, *Trajectory optimization, Algebra, Ascent, Calculation, Distance, Ephemeris, Error, Estimate, Linearity, Mission, Motion, Optimization, Orbit, Spacecraft, Trajectory.

For abstract, see STAR 05 15.
N67-28832 HC$3.00 MF$0.65

COMPUTATION OF APPROXIMATE FUEL-OPTIMAL CONTROL.
Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering.
D. L. Gray. May 67, 104p NASA-CR-84835, ESL-R-307
Grant NSG-496, Contract NGR-22-009/124/

Descriptors: *Computer program, *Fuel flow, *Iterative solution, *Optimal control, Computer, Control, Determination, Digital, Flow, Fortran, Fuel, Function, Invariance, Iteration, Linearity, Optimal, Plant, Program, Solution, Time.

For abstract, see STAR 05 15.
N67-28840 HC$3.00 MF$0.65

A STUDY OF BALLISTIC REENTRY TRAJECTORIES AT A VELOCITY OF 50 000 FEET PER SECOND (15 240 METERS PER SECOND).
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
L. C. Coltrane, and J. T. Suttles. Jun 67, 85p NASA-TN-D-4011
Contract 124-07-01-41-23

Descriptors: *Ballistic trajectory, *Hypersonic reentry, *Reentry trajectory, Altitude, Ballistics, Calculation, Computer, Error, Hypersonic, Lift, Profile, Reentry, Simulation, Skipout, Trajectory, Velocity.

For abstract, see STAR 05 15.
N67-28921 HC$3.00 MF$0.65

THE ORBITS OF LUNAR SATELLITES - AN INTRODUCTION.
Royal Aircraft Establishment, Farnborough (England).
G. E. Cook. Dec 66, 23p RAE-TR-66396

Descriptors: *Gravitational potential, *Lunar satellite, *Orbit perturbation, Celestial, Field, Gravitational, Harmonics, Lunar, Mechanics, Motion, Orbit, Perturbation, Potential, Rotation, Satellite, Secular, Spherical.

For abstract, see STAR 05 15.
N67-28922 HC$3.00 MF$0.65

ORBIT DETERMINATION FROM MINITRACK OBSERVATIONS.
Royal Aircraft Establishment, Farnborough (England).
R. H. Gooding. Nov 66, 19p RAE-TR-66360
Presented At the Roy. Soc. Meeting on Orbital Anal., 17-18 Oct. 1966

Descriptors: *Minitrack, *Orbit calculation, *Satellite orbit, *Satellite tracking and data acquisition network p, Accuracy, Acquisition, Alouette i satellite, Analysis, Ariel i satellite, Ariel ii satellite, Calculation, Conference, Data, Network, Observation, Orbit, Prediction, Satellite, Tiros vii satellite, Tracking.

For abstract, see STAR 05 15.
N67-28923 HC$3.00 MF$0.65

22D. SPACECRAFT LAUNCH VEHICLES AND GROUND SUPPORT

SPACE VEHICLE LAUNCHERS IN THE UNITED STATES.
les Lanceurs des Vehicules Spatiaux des Etats Unis
European Space Vehicle Launcher Development Organization, Paris (France). Basic Techniques Div.
M. Gilli. Sep 65, 48p ELDO-TM-F-20
in French Revised

Descriptors: *Launch vehicle, *Performance characteristics, *United states, Attitude, Characteristics, Control, Cost, Data, Dimension, Guidance, Performance, Propulsion, Roll, Stabilization, System, Table, Weight.

For abstract, see STAR 05 15.
N67-27932 HC$3.00 MF$0.65

A THREE-DIMENSIONAL DIGITAL ACQUISITION SIMULATION OF THE BLACK ARROW ATTITUDE CONTROL SYSTEM.
Royal Aircraft Establishment, Farnborough (England).
C. H. Garnett, and R. G. Langton. Mar 66, 20p RAE-TR-66104

Descriptors: *Attitude control, *Black arrow launch vehicle, *Digital simulation, Acquisition, Attitude, Control, Digital, Dimensional, Gimbal, Launch vehicle, Program, Simulation, Stability, System, Three.

For abstract, see STAR 05 15.
N67-28132 HC$3.00 MF$0.65

SATURN IB PROGRAM. TEST REPORT FOR FLEXIBLE HOSE, 1/4-INCH, 3000-PSIG AEROQUIP CORPORATION PART NUMBER 675003-4-0420, NASA DRAWING NUMBER 75 M11337-4-0420.
Chrysler Corp., New Orleans, La. Space Div.
For primary bibliographic entry see Field 13K.
For abstract, see STAR 05 15.
N67-28826 HC$3.00 MF$0.65

* U.S. GOVERNMENT PRINTING OFFICE : 1967 OL—305-086 (3)

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